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FLYING®

DECEMBER, 1959 VOLUME 65, NUMBER 6

THE COVER: George Beard photographed this high-wing, retractable-gear Cessna 210, newest of a long line of single-engine Cessnas.

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Air France–First European Airline to Fly Giant Boeing 707 Intercontinental Jets Across the Atlantic!

Here's another Air France "first" for the record! Soon Air France's Boeing 707 Intercontinental Jet will touch down at Orly Field after a 6½-hour non-stop flight from New York. This flight will mark the beginning of the world's first "jet-to-jet" service—Intercontinental jets non-stop daily to Paris, Caravelle jets from Paris to all Europe, Africa and the Middle East.

Air France is no stranger to the pages of aviation history. As early as 40 years ago, Lucien Bossoutrot made the first international commercial flight between France and England. Similar historic first flights include the first crossing of the South Atlantic, the Andes, and the first scheduled Far East service.

The inauguration of transatlantic jet service demonstrates the forward steps that have helped make Air France the world's largest airline, with the world's most personal jet service.

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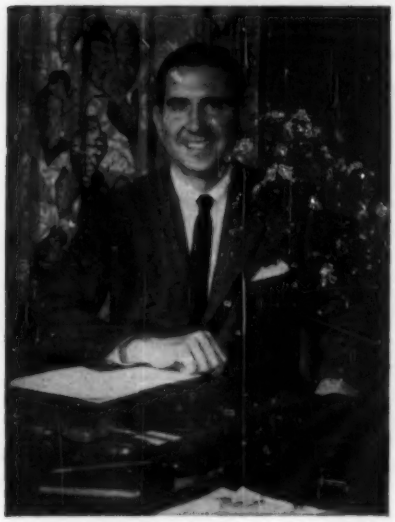

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MAILBOX

INSPIRATION

For some years now I have enjoyed FLYING's editorials and the "Airman's World." My purpose in writing and enclosing a snapshot of my three sons taken last fall at the local Smith Reynolds Airport, is to inform you of the effect of these editorials upon one 40-year-old father and his three sons.

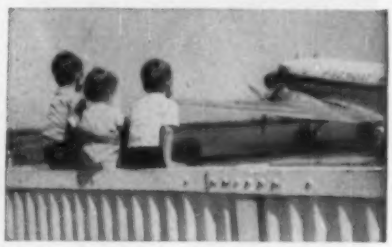
First I was motivated very strongly by your editorial of Sept. 1956. "Not To Be Seen in Moscow" in the last paragraph when you said "So I look at a few thousand private planes scattered among 156,000,000 people (American) and I look at a handful of boys who have managed to climb intellectual barriers and the economic roadblocks and I look at the aircraft industry and airlines desperate for people to man their enterprises and I look at the scores of communities which could not be less interested in airports and listen to parents who do not want to be bothered worrying about their sons and daughters in aviation and I begin to suspect that it doesn't much matter what General Twining sees in Moscow."

Similarly, your recent editorial "Formula for a Boy," in the June 1959 issue, where you state "I do not think that flight training is the whole answer to America's youth problem but I do think our lack of a comprehensive program is typical of the ineffective approach to the problem" really did the trick.

I was so motivated by that final paragraph in your 1956 editorial that I went out to Piedmont Aviation and took flying lessons; subsequently obtained my private license (No. 1377578). I have three sons, John, Jr., age 9, James Andrew, age 3½ and Joseph, age 2, all of whom want to be airline pilots and not have anything to do with their father's printing business when they grow up. This is all right with me. I thought the photograph enclosed might be indicative of the yearning of these youngsters for their future in aviation.

My wife still thinks I'm a little overzealous in this aviation business but I continue to reply that unless American youth, and my own sons in particular, are interested in aviation, either military, airline or private flying, then this country does not have many years to endure as a free nation. On several occasions I have taken my oldest son up in a Cub and let him handle the stick and I know by the look on his face that he gets a greater kick out of this than anything else he could do.

I think the biggest thrill I have gotten was three years ago when my oldest boy, John, Jr., was only six years old, flabbergasted a Piedmont Airline pilot who was walking to his DC-3 on the ramp when Johnny asked him the question, "Captain, did you file a VFR or an IFR flight plan from Winston to Cincinnati since the weather seems to be below minimums?" Needless to say the airline captain looked



at his co-pilot in a rather amazed fashion . . .

I intend to see that my sons get a crack at aviation now and in the future. Thank you for helping me toward that goal.

JOHN R. GORDON
Winston-Salem, N. C.

● *Every once in a while there is a simple, direct and beautifully honest statement about the concept of aviation which says everything we have long sought to say. The above letter is one of these, therefore we have presented it in its entirety.*—ED.

AIRMAN'S HOLIDAY

Your Overnight Stop—No. 53, September issue of FLYING, solved our problem of where to go for a week's vacation. It is truly Charlevoix, the Beautiful.

As suggested, we landed at the Charlevoix, (Mich.) Airport and secured accommodations across the street at the Silver Birch Motel.

Joseph A. McPhillips, manager of the airport was most accommodating.

My wife and I highly recommend this area to your readers.

RICHARD C. MCCONNELL
Attorney at Law
Cleveland, Ohio.

● *In preparing "Airman's Holiday" on Michigan published in September* FLYING, *Mr. McPhillips at Charlevoix was most cooperative. We are gratified that the McConnell vacation there was so pleasant and know Mr. McPhillips will be also. May many others follow the air trail in that direction.*—ED.

THE NAME'S THE SAME

Much to our surprise we found our name printed in "Mailbox" in September FLYING . . . but it was about a flying club of a different sort. So I thought you'd be interested in our club too. . . .

Our Sky Travelers Flying Club is owned and operated by a group of investors who have invested ample capital to

(Continued on page 8)

TYPE R-31A GLIDE SLOPE RECEIVER

CERTIFIED TO FAA TSO C-34, CATEGORY A.

Now — a glide slope receiver with ARC quality and precision! Covers all assigned channels — from 329.3 to 335.0 mc. New space saving modular design. Receiver weight: 6.0 pounds. Single shock mounting, M-41A adds 1.4 pounds. Use of multiple unit shock mounting reduces overall weight. Remote operation permits installation anywhere in aircraft. Low input power 1.5 amps at 13.5 volts; 0.7 at 27.5 volts. Crystal saving circuitry — 12 crystals cover all frequencies.

TYPE R-33A MARKER BEACON RECEIVER

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The R-31A and R-33A Receivers, shown with the T-25A ARC's 360 Channel VHF Transmitter, in the M-43A, one of ARC's new multiple shock mounts. Compact mount offers simplified installation plus reduced space and weight.

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City..... Zone... State.....

Veterans: Check here ☐ for Special Veteran Training Information.

MAILBOX

(Continued from page 6)

have the equipment it needs. Second, it is managed as any other business would be with equal service to every member.

At present we have a Cessna 150 for students; a Cessna 175 for x-country, and a Beech Bonanza also for x-country. And with our club growing as it is we will have to get another 175 soon.

It costs $100 for a life membership in our club. Once a member, one can fly any of the airplanes for which he is qualified —the Cessna 150 for $5 per hour; $7.50 for the 175 and $12 for the Bonanza. . . .

GEORGE H. HOBBS, Pres.
Las Vegas, Nev.

STATE AIRPORT DIRECTORIES

Reference is made to your editorial note to Mr. Walker's letter (FLYING—July '59) in regard to states which offer airport directories. After recently requesting directories from many of the northeastern states, the best and most complete was received from Vermont . . . a most pleasant surprise in its arrangement, format and open-flat type of binding.

DANE H. COREY
Watervliet Arsenal Flying Club
Watervliet, N. Y.

THE LAST B-25

I just happened to glance at an old issue of FLYING, the Dec. 1958 issue, and on page 106 noticed a B-25. Started to read about it and found it to be the last one built.

It was built by North American at Kansas City and I am the Air Force inspector who put the final acceptance on it for the AF. Somewhere among the records they will find my signature, (and) I have the original picture of this last B-25 . . . (I was Jimmie Doolittle's crew chief when he was a 1st Lieut. at Chanute Field back in 1926).

C. O. LAURIE
Gashland, Mo.

MORE ABOUT FLYING IN ALASKA

The purpose of this letter is twofold. First, to let you know that as long time readers of your magazine we enjoy it over and over again before the next issue reaches us. Secondly, to correct a few statements in the article "Tips to the Tyro Alaska Bound." (August issue)

Fee entry time for Customs is 8:00 a.m. to 5:00 p.m. (not 4:00 p.m.) Monday through Saturday . . . (2) a lone plane entry on Sunday can cost $38.40 ($5.20 more than Col. Crawford's $33) . . . (3) all American money is discounted in Canada not just American Express checks . . . (4) several new hotels in Ft. St. John make it quite easy to get a room there now . . . (5) Northway airport is the Port of Entry. Not only is the grocery store here but, contrary to information we have 15 rooms to rent which generally takes care of the traffic . . . Aviation gas 80/87, 91/98 and 115/145 oct. and both compounded and uncompounded oils are available 24-hours a day . . . cafe open from 6:00 a.m. to 10:00 p.m. daily; heater service available for aircraft RON in cold weather . . . FAA maintains 24-hour service for weather and flight plans. . . . Northway is seven miles south of the Alaska Highway, not 20. Because of the rivers that join together near the highway directly north of the field, and as they

are the first ones of any size you have come over for more than 60 miles, you should have no difficulty locating Northway. . . . Tanacross has been abandoned but runways are in excellent condition.

Airways does cover some very rugged country as the author stated but the leg from Fort Nelson to Watson by highway is much more rugged, higher and subject to whims of weather than the airways route. . . . Weather around Kluane Lake (between Northway and Whitehorse) is no different than any place in the mountains when storms are nearby . . .

At Burwash gas is available as he says but there are also some real acoommodating folks there who have a lodge with overnight facilities. You will find a telephone there . . . in the event you want to call Whitehorse tower . . . (and finally) in reviewing the mileage given, they should not be taken quite literally as some are as much as 60 miles off.

We trust you will find space for these corrections, especially those that could be detrimental to our business.

FLOYD R. MILLER, Owner
Floyd Miller Enterprises
Northway Airport, Alaska.

A REQUEST FROM INDIA

I must first start by saying what a wonderful magazine you have in FLYING . . . I have been reading it since 1942.

Now I wonder if your readers could be good enough to send me any magazines on aviation which they do not require. I was myself a private pilot until I got into the manufacturing of tea. Being connected in this industry, I am in a very remote area of the country and the only aircraft I see are with field glasses.

So come on you guys. Have a heart and send me some back issues.

R. K. DASTUR
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Briefings . . .

COMANCHE 277MM is the latest of a number of airplanes personally owned over the years by A. S. "Mike" Monroney (right) Junior Senator from Oklahoma, and an accepted authority on aviation in the U. S. Senate. By his side, and equally interested in the new acquisi-

tion, is David Jay Perry, experienced pilot and for the past 14 years the Senator's executive secretary. The plane's registration number is not without design —the "2" standing for the position of Junior Senator; "77," the number of counties in Oklahoma; and "MM," of course, is "Mike" Monroney.

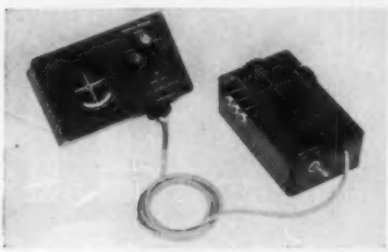
IN AN EFFORT to make it easier for pilots to add class or type ratings to pilot certificates, effective Sept. 15 last, FAA removed the requirement (Part 20 CAR) that pilots fly solo while logging five take-offs and landings for a type rating on a particular aircraft. Under the new amendment, an applicant may meet the requirement whether he is sole occupant of the aircraft or with an appropriately rated pilot aboard.

EXCLUSIVE SALES RIGHTS to the Bolkow 102 Heli-Trainer, single-seat, single rotor helicopter, in the U. S., Canada, Mexico and Central America have been acquired by Hiller Aircraft from Apparatebau Nabern GmbH Ottobrunn, Germany. Used for pre-flight instruction, the trainer is said to lower training costs to nearly one-fourth that of a flying helicopter. Hiller also has option to produce the machine at its Palo Alto plant.

A DIRECT-POWERED, 15-pound Automatic Direction Finder is the first of several advanced design avionics equipments which NAVCO Electronics, 1211 Fourth St., Santa Monica, Calif. has developed for commercial aviation. Designed for the single and light-twin-engine aircraft category the NAVCO Model RDF-119 is priced at $795 less installation kit. The company plans to introduce this product through a nationwide demonstration tour under direction of B. V. Delatour who has recently assumed the position of NAVCO's commercial sales manager.

DEVELOPMENT of a small, light-weight free-turbine engine "designed for low-cost use in lightplanes and helicopters" has been announced by Pratt & Whitney's Canadian plant. Designated PT-6, the engine is said to weigh 250 lbs. and develop 500 eshp. As a turboprop it will be used on lightplanes; in turboshaft form on helicopters. A guaranteed maximum specific fuel consumption of 0.69 lbs. eshp/hr is quoted for the turboprop version.

ICONIX, INC., electronics manufacturers of Palo Alto, Calif. (945 Industrial Ave.), is marketing an Instrument Landing System (ILS) Simulator designated Model 11-100A, and priced at $137.50 complete. Independent of any ground radio or naviga-



tion facility—therefore easily transferred from one aircraft to another—this simulator consists of an instrument indicator and controller which provides an instructor with the means for displaying both cross pointer and marker indications to an instrument trainee.

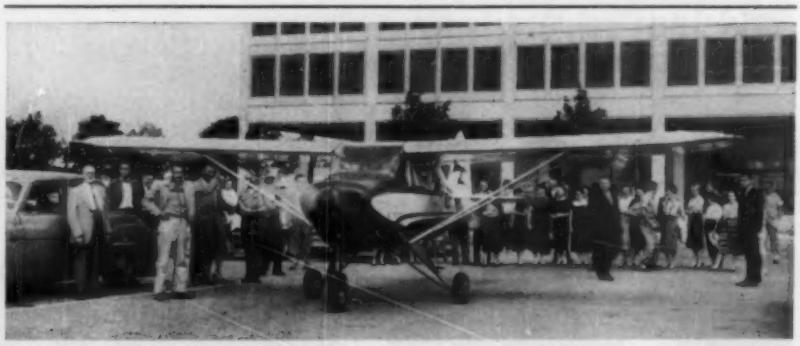
FRONT YARD air transportation, automatic flight control equipment, fuel and oil problems of the turbine age were part of the two-day Operations and Maintenance symposium sponsored by Airwork at Millville, N. J. Approximately 350 pilots and aircraft officials attending were impressed

with the new Brantley two-place helicopter which gave them airport-to-home demonstrations. (Above) Mel Lamb, manager of E. Hampton (L. I.) Airport, and Mrs. David Dows, wife of an Airwork official hail the Brantley on one of its many demonstration flights.

FOR DC-3 OWNERS Aeroquip Corp., Jackson, Mich., has developed a new Oil Separator Assembly Kit designed to control discharge from crankcase breather lines. Consisting of separator, hose, fittings, adapter and vent tube, the installation is said to require only minor modifications, with no relocation of other accessories.

AT BOEING Aircraft, Wichita, Kan., a revolutionary new low frequency instrument landing system, said to weigh less than ten pounds and costing only a fraction of present systems, has successfully passed initial testing. Basically the system calls for two "homer beacons" on the ground and only the addition of two

(Continued on page 98)



IN THE MIDST of one of the world's largest shopping centers, Ed Lyons of Zahns Airport, Amityville, L. I. prepared for take-off in this Tri-Pacer for what is probably the last take-off from historic Roosevelt Field, now turned shopping center. The plane had been on display at the Franklin National Bank Building at Roosevelt Shopping Center in conjunction with a new aviation finance program initiated by the bank for Long Island residents. Finance plans include time-purchase by individuals or operators of new and used aircraft, flight instruction, new equipment, inspections, overhaul, conversion and power plant installation on a 36-month basis.

Mobil

FLY WEATHER-WISE

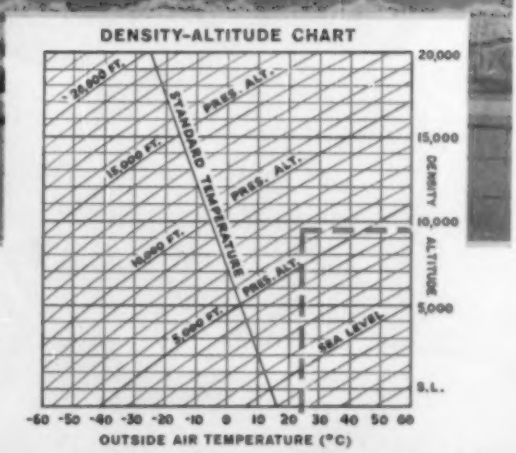
AIR DENSITY

EFFECT ON FLIGHT

These weather items prepared in consultation with the United States Weather Bureau

Air density plays an important part in the take-off and flight performance of today's gas-turbine aircraft. Low densities reduce engine thrust and aerodynamic lift. Since density decreases with altitude, the higher the altitude the longer the take-off run. Therefore the density at airport altitude (Density-Altitude) is an important factor in calculating maximum fuel load and pay load. Barometric pressure and ground air temperature affect density. As both are continually changing, the Density-Altitude of the airport continually changes—may vary as much as several thousand feet a day.

Density-Altitude can be determined by knowing barometric pressure (at airport, not sea level) and temperature. Charts similar to the one below can be used.



Charts like this are useful in determining Density-Altitude. The Pressure-Altitude (reading when altimeter is set at 29.92) and the Temperature at the airport are entered to find Density-Altitude.

Today, more than ever, it is important to select a jet fuel with the right performance over the full range of varying atmospheric conditions. Mobil has developed a complete line of such quality jet fuels—Mobiljet 140, Mobiljet 158 and Mobiljet 476. Fly weather-wise . . . fly Mobil.

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"I Left The Prop Behind"

A behind-scenes report on the 1,304-mile, 12½-hour World Record Flight of a dead-engined twin Apache—and the "secret weapon technique" that made it possible

by **HERB FISHER** international aviation authority, veteran test pilot, author

Mr. Fisher

Sunrise, Aug. 1, 1959—zero-hour for an "*engine-out*" World Record attempt. Three men huddled by a new twin Apache, checking maps, weather data. Time, 5:21 a.m. Then: "Okay, Dick—*now or never.*"

Dick Jagitsch—sales manager for Arkansas Aviation Sales, Inc., Piper distributors for Arkansas—taxied to left of center, pulled a mag check. No burnout necessary. He jotted in his personal log:

"Wind, calm. Temp, 78°. Humidity, 90. Altimeter, 30.01. Fuel, 108 gals. *Gross weight, 3,170 lbs.* Total time left engine, just 12½ hours. Right engine, *none—I left the prop behind.*"

Jagitsch opened throttle. The twin Apache—one engine straining forward, the other dead—moved down the Little Rock Municipal Airport runway, gathered speed. Slight yaw to starboard . . . 600 feet down, now, where an Apache normally breaks ground . . . no rudder "feel" yet. Jagitsch waited. Then—point-of-no-return . . . rudder beginning to "bite" the airstream . . . full throttle . . . end of the strip coming up . . . 3,500 feet down . . . *now!* The "Arkansas Traveler" lifted gently, climbed-out painlessly at 95 mph, banked into the morning mists. Jagitsch switched from left main tank to right auxiliary, took out a handkerchief, wiped his brow.

"We left this one behind—but we had a 'secret weapon' in the other engine!" Left to right: David Feltus, Pilot Dick Jagitsch, Jimmy Woodard.

Final briefing—(l/r) Woodard, Jagitsch and Feltus.

"Arkansas Traveler," on the way to new World Records in distance and time-aloft, one prop removed and the spinner taped to show it's not revolving . . . the other engine fired by Champion's new REM-40-E *Foul-Resistant* spark plugs, making possible prolonged, low-power, "cold-engine" operation.

Pulling this 3,170-lb. load from off-center was a single four-cylinder engine rated at 160 horsepower—less hp than Jagitsch had under the hood of his car! Firing this 160-hp Lycoming was what Jagitsch had told me was "a secret weapon that could make or break this flight"— eight *very unordinary* spark plugs.

"Herb, you've had long experience as a test pilot . . . you know very well what would happen if we held this light twin to *low-power*, '*cold-engine*' operation all day. We'd foul plugs royally! Yet, to beat the records set by bigger, more powerful twins flying *fast* and *hot* to stave off plug-fouling, we'd have to hold power back—'way back!—to keep our light twin up long enough to go the distance on only 90-some gallons. Nobody had ever attempted such continuous and prolonged cold-engine operation. But Herb, when Champion announced it had successfully tested a really *foul-resistant* spark plug, we figured 'why not *try* the first low-power endurance run in aviation history—on one cold engine and one dead one?' "

Jagitsch had cylinder-head temperature gauges rigged fore and aft to monitor this low-power marathon . . .

Two hours went by. Jagitsch's tensions of six weeks eased. But, prematurely. A 20-knot headwind set in. By 2 p.m., Jagitsch was an hour behind schedule.

By mid-afternoon, he was bucking serious headwinds and blinding rain as thunderstorms raked his measured course around Arkansas and Tennessee. More precious time, fuel, lost. VFR navigation at 1,000 feet—a nightmare. Cylinder-head temperatures—"dangerously cold" as Jagitsch doggedly held back power to conserve fuel. How long now before *some* plug-fouling, misfiring? He'd never make the record if he had to add power, heat . . . he listened intently, apprehensively, to the lone engine. Headwinds, pounding rain picked up . . .

At Little Rock, the owners of Arkansas Traveler—David Feltus, President, and Jimmy Woodard, Vice-President, Arkansas Aviation Sales—likewise were in a cold sweat. At a blackboard they charted progress and remaining fuel, relayed by FAA check points, and fed continuous advisories to Jagitsch. But when the weather bureau warned that Jagitsch was heading down a solid alley of worse thunderstorms, they couldn't raise him by radio! Feltus made a decision, called Woodard to a map . . .

Woodard took off in a 250 Comanche, intercepted the "peg-legged" Arkansas Traveler, told Jagitsch to swing north . . .

Twelve hours-26 minutes after take-off, Jagitsch eased his gimped twin down. Momentarily ignoring cheering crowds, swarming newsmen and TV cameramen, he scrawled in his private log:

"Fuel—93 gals. consumed, 15 left. Max. altitude, 3,000; min., 600. Engine —*smooth as silk*. Cylinder-head gauges indicated 'cold' all the way—12½ hrs. at very low power! Mystery why *no* misfiring, fouling. Plugs must be heavy with lead/carbon, but maybe not like on standard plugs."

Jagitsch got out. Feltus, Woodard and Arkansas Secretary-of-State C. G. "Crip" Hall rushed forward.

"Jagitsch," said Feltus, "you and that wonderful ex-twin of ours just set a World Record—1,304 miles *with one engine dead*. As you know, only two men in aviation history had attempted it before you—and they were putting the *heat* to longer-range, more *powerful* twins. What's more, you were up almost *twice as long*—another World Record!"

Later, Jagitsch—more amazed the more he thought about his "silk-smooth engine mystery"—excused himself, got a wrench, pulled the spark plugs. His last log entry:

"New REM-40-E Foul-Resistant Champions—*clean as a whistle! Self-cleaning and foul-resistant on a long, cold-engine haul where ordinary plugs would have grounded us.*"

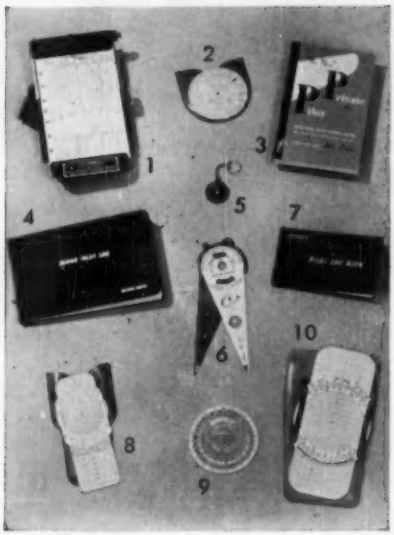
CHAMPION SPARK PLUG CO.
TOLEDO 1, OHIO

Glad the hours of anxiety are over, Mrs. Dick Jagitsch welcomes her pilot husband back from 12½ hours "upstairs" with one engine dead.

Symbolically, when Jagitsch was presented this trophy commemorating his World Record flight, he accidentally dropped it and the right wing and engine broke off—the same engine that was inoperative during the actual flight.

Arkansas Secretary-of-State C. G. "Crip" Hall (r) presents "Arkansas Traveler Certificates" to (l/r) Woodard, Jagitsch and Feltus. Rarely are citizens of the state awarded this honor.

"Sunrise, Aug. 1, 1959—zero-hour for an '*engine-out*' World Record attempt. Three men huddled by a new twin Apache, checking maps, weather data. Time, 5:21 a.m. Then: 'Okay, Dick—*now or never.*' "



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HANGAR FLYING

SWITCH ON, FUEL OFF

WHILE stationed at Fort Lewis, Wash., in February of 1957, I decided to take up flying where I had left off a few years back. So, armed with a new physical and a student permit, I engaged the services of Tahoma Flying Service, Thunn Field, Puyallup, Wash. After about two hours of dual in an Aeronca Champion, my instructor and I went up on a sunny but cold day to shoot crosswind take-offs and landings.

While attempting to negotiate one of these landings I found that I had used up most of the runway and decided to give it another try. As I swung the ship around to line up with the runway, my hand was groping along the left side of the cockpit for the recess which contains the switch, carburetor heat control and fuel shut-off lever, moving it, inadvertently to the "OFF" position. Finding the familiar carburetor heat control, I turned it off, opened the throttle and after a short run we were airborne.

Then, at an altitude of about 100 feet, the engine quit. My instructor yelled: "I've got it," at the same time as I yelled to him: "It's all yours." He pulled the ship up into a stall and just before it broke shoved the stick forward and crossed controls, putting the Aeronca into a slip, bringing it down to a three-point landing and breaking it to a stop 50 feet from the end of the runway. The end of the runway drops off about 30 to 40 feet into a gully filled with tree stumps and large-sized rocks.

We just sat there for a few seconds, then I reached down to turn off the switch and saw the cause of the engine failure.

PFC. ROBERT CILEC

San Francisco, Calif.

GONE TO SEED

I WAS 18 years old and held a private license in August 1950 when I took a buddy of mine for his first airplane ride in a rented Ercoupe.

We were taking off from a small but very popular grass field where I had been flying, off and on, for the past two years. Due to the normal prevailing winds in the Tulsa area, the majority of my take-offs and landings were made on the north-south runway, this day, however, a good breeze was blowing from the southeast.

As I taxied out I noticed several yellow Piper Cubs from the Spartan school shooting landings on the seldom used southeast-northwest runway. Following suit, I taxied to the northwest active and made my run-up. Everything checked out in good order so after a 360-degree turn to clear traffic I opened the throttle and started our take-off run.

I noticed that the grass on the runway was pretty high but did not think much of it. As we sped on our way my passenger made a crack: "Is this an airplane or a lawn mower?". We had gobbled up too much runway when I realized that the engine was revving down. There I was, going too fast to stop and not fast enough to fly. Luckily, there was no fence at the fast approaching other end of the runway, but, what possibly was just as bad, a heavy growth of Oklahoma sunflowers, four to six feet tall, loomed directly in our path. With throttle closed and brakes locked we disappeared into the sunflowers.

After a rather bumpy ride we slid to a stop in a clearing. Sunflowers, weeds and assorted greenery were tangled around the navigation lights, antenna, and most anyplace they could cling to. Otherwise there was no damage. As we sat in the clearing and I started to get the shakes, my passenger looked at me and asked: "Aren't we going to take off, huh?"

Investigation revealed that the tall grass has gone to seed and as we chewed our way through it the air cleaner had been clogged full. Had I known the trouble I could have pulled on the carburetor heat and given my strangling engine another source of air. Such is the price of ignorance.

JOHN A. GUTHRIE

Tulsa, Okla.

STRETCHING THE LUCK

IT WAS one of these days when you fervently hope that the weatherman is right. We arrived at Brussels, Belgium Grimbergen airport from Frankfurt on Main, Germany, with a good weather report, to pick up an Auster Taylorcraft which has been purchased in London. The aircraft was flown across the channel by a British pilot, who subsequently ran into foul weather and left the plane at Grimbergen. I was chosen to complete the ferry flight as I held a recently issued British pilot's license after 30 hours in a Tiger Moth.

This apparent lack of experience did not deter, however, my friend and colleague Hans Kluttig to come along for a ride and now we were both sitting fogbound at Grimbergen with Duesseldorf, Cologne and Luxemburg also reporting below VFR minimums. In addition, we only had credit cards for the German registration the airplane was supposed to get and paying cash for fuel and hangar had just about depleted our funds. So when, late in the afternoon Brussels reported three miles in haze, we worked out a quick flight plan to Zuid-Limburg, an unlighted hard-surfaced airport at the southeastern tip of Netherlands, which was as close to Germany as we could possibly get. Distance was only 68 miles, but with

(Continued on page 93)

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HAVE YOU READ?

BY JAMES F. SUNDERMAN

TWENTY SECONDS TO LIVE, by Elizabeth Land (Dutton, $3.25)

It had never been done until one April night in 1958 when 23-year-old Air Force Lt. James Obenauf landed a crippled B-47 Stratojet bomber *from the co-pilot's seat.* (In the B-47 the pilot and co-pilot seats are in tandem).

This feat, culminating one of the most daring, heroic and courageous air operations in peacetime brought Obenauf the AF's highest flight "gong," the D.F.C., and an aircraft commander's slot on a SAC crew—the youngest to achieve this honor.

It all began as a normal night training mission from Dyess AFB to Denver with a bomb run on Dalhart, Tex. The three man crew was augmented that night by a fourth member, Maj. Joe Maxwell, navigator bombardier check rider, assigned to grade the mission's efficiency.

Engine fire on a B-47 is invariably fatal. It developed this night and the pilot gave the bail-out order. Two of the four aboard got out, but Obenauf's cartridge ejection system failed. As he climbed from his seat to leave by an alternate escape hatch, he noticed the unconscious form of Joe Maxwell lying on the crawlway, oxygen mask by his side.

Facing an explosion any moment, Obenauf crawled back into his seat to stick with the situation rather than desert his helpless buddy. The odds against safe landing were astronomical, and he knew it.

Whatever it is in a man that makes him take this gamble, Jim Obenauf had it. This book is his life story, and a dramatic suspense-filled reconstruction of the terror flight back from the edge of oblivion.

The Obenauf story is a testimony to the quality of young American airmanship.

THE HELICOPTER, by Jacob Shapiro (Macmillan, $4.50).

Popular study of the history and current utilization of the helicopter, its design, scientific principles of flight, its capabilities and structure.

1958-1959 AIRCRAFT YEARBOOK, edited by James J. Haggerty, Jr. (American Aviation Publications, $6).

The 40th annual edition of this official Aerospace Industries Association reference guide presenting in photo, narrative and statistical survey all phases of American civil and military aviation and its industrial base in the year 1958. Added features include a chronology of flight,

(Continued on page 18)

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HAVE YOU READ?

(Continued from page 18)

research and development highlights, aerial flight records during the year, and a bibliography of published aviation book literature.

STRATEGY IN THE MISSILE AGE, by Dr. Bernard Brodie (Princeton University Press. $6.50)

If reaction in high level military/civilian circles is any gauge, this volume is one of the singular significant books on current military thought and the sweeping problems posed by the new weapons.

Brodie, one of America's foremost and prolific writers on military affairs, produced the scholarly volume as a Rand Corporation study for the Air Force. He divides the discussion into two broad parts. Part I, "The Origins of Air Strategy" reviews and develops the air concept in war and assesses its role and impact in WW II, its first big test. Part II, "New Problems and New Approaches" (about ⅔ of the book) moves into the current era and the reality of nuclear weapons as well as the new exact systems for their delivery.

Brodie considers SAC's complex problems of counterforce or pre-emptive strategies (where we strike the first blow), of aircraft and missile bases abroad, of cities as potential targets, of limited war. With regard to the latter, Brodie maintains we should provide ourselves with the capability to handle limited wars, but not at the expense or diversion of our efforts from big war problems. Limited war eruption into a total war is a real and likely possibility.

The book lacks any "service" bias, offers no program, nor defends a policy, unique for a study of this kind. It is a commendable analysis of military strength requirements for the 1960s, and promulgates the necessary military posture we must have to prevent war.

FLIGHT FROM ASHIYA by Elliott Arnold (Knopf, $3.95).

Twelve hours in the life of two USAF Air Rescue crews, flying out of Ashiya AFB, Japan, over typhoon swept seas, encompasses the story of Elliot Arnold's latest air novel.

A sinking lifeboat holding three women and two children—the only survivors of a Jap cargo vessel ripped apart by the storm and sighted by a British passenger flying boat—is the objective of the rescue mission.

The story is ingeniously constructed with the flashback technique. Scenes alternate between incidents aboard the two

(Continued on page 62)

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A going piece of machinery! That's the beautiful new 1960 Piper Comanche. But that's not all. Fast and nimble as the Comanche is... with its laminar flow wing and single-piece jet-type stabilator ...it's also the roomiest, most comfortable, most *usable* high performance single-engine business airplane on the market today.

Roomiest? Most comfortable? No question. Put four *big* people in the Comanche and see how there's much more room all around for everyone.

Most usable? No question. The Comanche has a much larger weight allowance for the equipment so necessary for modern 1960 business flying. Fully equipped for IFR, the Comanche, 180 or 250 horsepower, carries four passengers and standard fuel load with allowance left over.

Surprising? Not at all. The Comanche was designed completely new from scratch for this modern era of business flying. It is the only all-new, all-metal, single-engine business plane to go on the market in more than 10 years. Little wonder it is the only one that meets *today's* all-around standards for comfort, equipment *and performance*. *And, as usual, Piper offers a better airplane for less money.*

NEW CABIN BEAUTY!

You'll exclaim at the beautiful new styling of the 1960 Comanche interior. There's new comfort, too, with new three-position reclining front seats, optional headrests. And new quiet flight adds more restfulness to Comanche travel.

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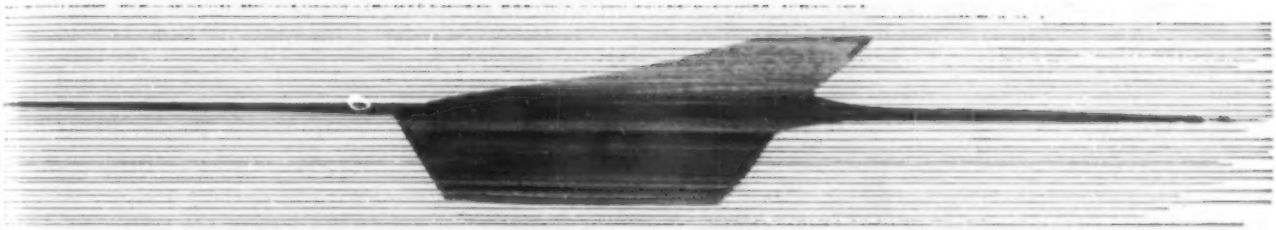

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GILL ROBB WILSON
Publisher

ANOTHER facet of profitable business waits to be created in the area of aviation by the right combination of brains and capital.

In addition to being lucrative it would originally be non-competitive and free enterprise in character, an advantage the American businessman is beginning to appreciate with more than lip service.

The opportunity lies in the development of an airwise pleasure and sport flying market—i.e., broadening the base of personal flying.

Public participation has been accomplished in the sports car world to a degree which has had notable impact. The soapbox derbies, hotrod contests and sports car races have gone far to create interest in the small foreign car and the chain reaction has hit the apparently impregnable automobile industry of the United States like a ton of bricks.

The same type of thing has taken place in boating. The small boat has become "Big business" with a capital "B". Boating enthusiasts are everywhere and, like the sports car movement, boating has ridden the crest of our national prosperity to undreamed heights.

I doubt that any one in big business foresaw either of these developments. For long the sports car tinkerer and the small boat enthusiast were sneered at as hobbyists and this has been too the lot of the "private pilot." Nobody ever comes right out and says so but "private pilot" often has seemed more an epithet than a rating, despite that the private pilot was the author of the air age and the chap who pointed the way to the stars when the dimwitted were quipping that "you don't have to be crazy to fly—but it helps."

Excuses for the shrinking of personal flying are easy to offer—hazards, inconvenience, impossibility of family participation, cost, ad infinitum. But as a matter of fact these excuses apply with even greater force to the sports car and boating activity. They are only excuses—not reasons.

I judge leadership in creative promotion of sport and pleasure flying would necessarily have to come from outside the industry itself, top-heavy as it is with commitments in other directions. Nor do any of the organizations of aviation appear to have enough on the ball to move off the dead center of public lethargy which they have been helpless to prevent.

The original Cleveland Air Races, sponsored by the once dynamic National Aeronautic Association but more significantly organized and run by private enterprise, were a constructive influence in expansion of the public base of flying until they got off the track in the matter of military showmanship. Those races, however, did for a time inspire thousands of people to take up flying and they did challenge existing pilots to polish their skills on hundreds of local airports. Any veteran of those days will testify that the fun, excitement and downright satisfaction of developing his airmanship to the point of an art was among the happiest experiences of his life. Ask Tony LeVier, Earl Ortman, Dorothy Hester, Jackie Cochran, Jim Doolittle, or any one of a thousand others—and I hate to stop listing their names because they were among the actual authors of American airpower—Roscoe Turner, Benny Howard, Phoebe Omlie, et al.

There now are incontrovertible evidences that the times are ripe for a renaissance in personal flying.

The lightplane of today—and I mean the truly lightplane, could be marketed profitably in volume if there was motivation to buy for pleasure and sport. The money is there. But there are no standards of skill set to challenge the private pilot, no contests in which he can demonstrate his precision, originality or finesse; no national recognition for which he may strive. The private pilot is without incentive.

The limitless areas of interest that could be opened up by organized private flying are unmatched by any other form of recreation. There is good reason behind the observation that if one ever gets the virus of flying enthusiasm in his blood he never gets over it. The reason for this is that the range of interest is inexhaustible—technology, travel, geography, adventure, sociology—private flying is a gateway. When they eventually come face to face with personal experience in flying, the educator, the preacher, the scientist, the professional man become its most rabid devotees.

Much that is essential to the rebirth of private flying already exists. There are a half dozen models of truly light aircraft in which one might come to physical grief but it would require a determined effort. On the other hand one might practice precision in handling these planes until he had exhausted his time and patience before he exhausted the challenge to skill that the planes offer.

Across the country are thousands of community airports in a position to extend hospitality to the rebirth of private flying. Such activity would have no effect upon the crowded airways and would on the other hand be a mighty influence in breeding passenger enthusiasm for air commerce—and the jets must have passengers in great numbers unless the airlines of the United States are to be engulfed in eventual nationalization.

And who can but wonder from whence will come the pilots of tomorrow for the business planes, the freighters, the inter-urban aerial buses, to say nothing of the supersonic passenger liners unless down where we live among the grass roots there is generated the incentive to fly.

AMERICAN AIRLINES ANNOUNCES

NONSTOP 707 JETS BETWEEN NEW YORK AND SAN FRANCISCO

Two flights daily—starting November 1st. Leave New York at 7:00 p.m., arrive San Francisco at 10:10 p.m. Leave San Francisco at 2:15 p.m., arrive New York at 10:15 p.m.

Starting November 2nd. You can leave New York at 8:45 a.m. and arrive San Francisco at 11:55 a.m. Leave San Francisco at 8:25 a.m., arrive New York at 4:25 p.m.

You can fly from New York to San Francisco in only 6 hours 10 minutes—from San Francisco to New York in only 5 hours—aboard American's popular 707 Jet Flagships, the world's fastest and most proven-jetliners!

Already, Boeing jetliners have carried over 900,000 passengers and logged better than 24 million jet miles. No other U.S. jetliner is quieter or more vibration-free. American's 707 Jet Flagships —most comfortable way to fly!

AMERICAN AIRLINES

The Jet Airline

AMERICA'S 'MAIN STREET' AIR

The local airline mission is to furnish first class jet age air transportation from the smaller, outlying communities to the busy air terminals of the world's mainline airways of the big jets.

By LOU DAVIS

Long-haul and short-haul airplanes of the Jet Age—the Boeing 707 and the Fairchild F-27.

LINES

AMERICA'S MAIN STREET airlines linking more than 500 towns and cities are quietly revolutionizing travel and business habits throughout the land and their growth has hardly started, in the opinion of close observers.

The 20 local service airlines in only ten years have more than doubled the number of communities served, and have increased their passenger traffic ten times. Their plane fleet is four times larger, and promises to continue growing as improved piston and turbine-powered models become available.

In nearly 300 communities they are providing the only scheduled airline service that is available.

The Civil Aeronautics Board has approved several thousand miles of new routes for these carriers in recent months. A big development program is ahead, but there will be growing pains too.

If you haven't flown on your own local service airline, it's a safe bet that you will be doing so before long—if you travel at all. In any event, these small transports, from the dependable but obsolete DC-3 to the most modern turboprop craft, promise to have more to do with

Above: Bonanza Airlines' F-27A "Silver Dart" over Hoover (Boulder) Dam with Lake Meade in background.

your future and that of the jet age of air transportation than you realize.

Because it's up to the hippity-hop lines to generate much of the new traffic needed to make the giant, 100-passenger, long-haul jets and turboprops pay off for their trunk line and coast-to-coast route operators.

They must not only carry you and your neighbors and business associates, but they must haul your mail, and your high priority cargo and freight.

The "locals" are the broad base support service to the main jet lanes. They serve about a third of the U. S. population with more than 35,500 miles of air routes—and this figure is going up almost every month.

In 1958 these "little lines" in the United States totaled 13. The new states, Hawaii and Alaska, raised the 1959 system to 20.

Since the first 13 U.S. and territorial local lines received temporary operating certificates in 1947, annual passenger revenues have skyrocketed from $2,280,000 in 1947 to $56,488,000 for 1958. This was only 59.4 per cent of the total $94 million tallied by them last year. Of the total income, $4-plus million was for cargo and other non-mail revenue and $34 million in public service revenue was received for delivering air mail to 516 cities. The locals carried 4,583,000 passengers more than 73 million miles in 1958.

Ticketed passengers included housewives on shopping trips, ministers enroute to preach before area congregations, salesmen, lawyers arguing cases at state capitals, mothers visiting grandchildren, atom scientists, bank presidents, industrial giants, railroad crews on "dead-head," bridge builders and men and women from all ranks and walks of life—they are "Main Street" airborne.

What does all this mean to you?

The pattern for living in the jet age insists that you and your community have first class air transportation, air mail and cargo service.

For instance, if you are planning a jet flight to Hawaii from San Francisco, you should not have to take the equivalent of a stagecoach from your home to the nearest trunkline jet terminal. If you're a business man in El Centro, you must have fast, efficient, comfortable air transportation to make it possible for you and other business and industry managements to keep pace with the daily challenge of intensely competitive markets.

Thus, for very practical personal reasons, the short haul airliners are important to you and your future. They are as essential to your community as were the spur line local trains and street cars which served the main line railroad terminal in the 20s and 30s.

Senator Alan Bible of Nevada has said, "The great social and economic strides made by America's smaller communities in recent years can be traced in large measure to the advent of feeder airlines. This convenient, speedy method of transportation broke the back of isolation which had been thrust upon these cities in former years."

The Nevada Senator's city of Las Vegas is a prime example of how a desert city can carve a bright future for itself through maximum utilization of air transportation. Every day 88 scheduled airliners load and unload 2,500

passengers at this desert retreat. For the first six months of 1959, Las Vegas recorded 444,000 passengers. "Dedicated to and specializing in service to the smaller communities of the nation, these carriers have opened new industrial vistas which have contributed greatly to a continuing growth and development," Senator Bible pointed out recently. "This ready accessibility of air travel has encouraged a decentralization of industry from the metropolitan centers to the more remote outlying areas. Local airlines have tied these small communities to their major trading centers and at the same time have brought about a broader based economy that benefits everyone."

The local airline network blankets most of the country. Only southern Florida, northern Maine and small portions of the west and northwest are still without local service. It is possible to go coast-to-coast via local carrier airlines. There is little difference in total fare, but the type of equipment runs the gamut from DC-3s to Convairs, Martins and F-27s. Many experts on travel predict that local service tours of the country will ultimately grow to great popularity. They believe there is no other more exciting, quicker way to sightsee the U. S.—the jets of the trunks fly too high. In fact, local and trunkline managements are now pooling their best talents to work out tours with travel agents that generate new air tourist attractions from all points of the nation.

The more progressive trunk lines are wooing the locals because one-quarter to one-third of every local carrier's ticket dollar goes to the big operators. In one year locals gave the trunks $27 million and got but $17 million back. There are also important changes in traffic and route patterns in progress, spurred by the jets.

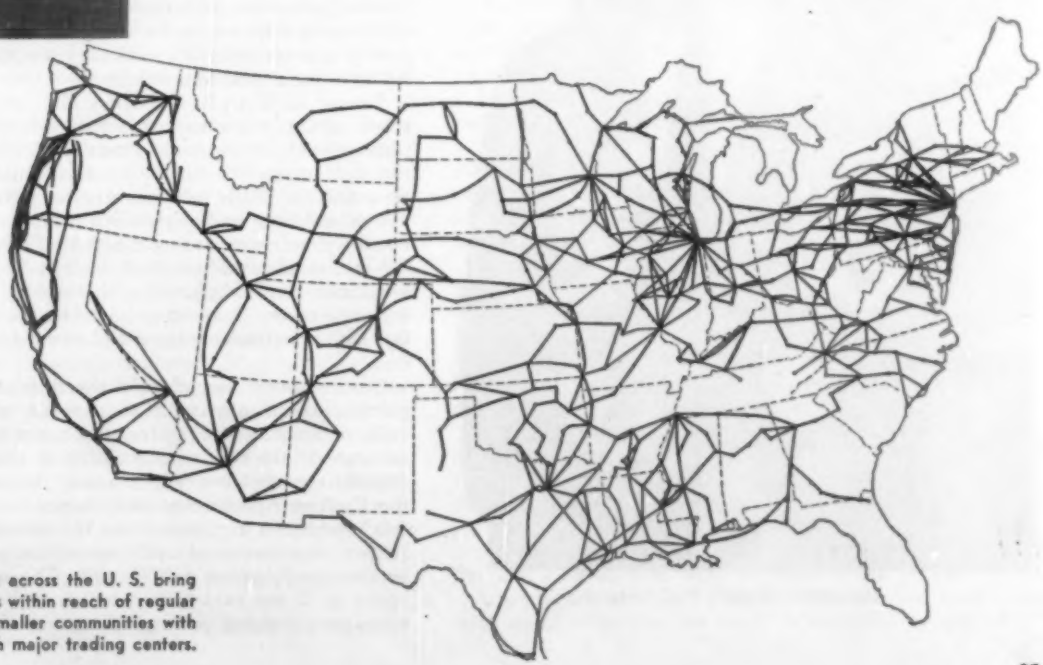
G. Joseph Minetti, member of the Civil Aeronautics Board, says, "I believe that as trunk carriers phase in their jet equipment there will be a greater tendency to concentrate on major and long haul markets. This would furnish the necessity and the opportunity for local carriers to operate more substantial volume of short haul service—in one case a local service carrier, operating a route formerly served by a trunk carrier, succeeded in increasing intermediate point traffic nearly fourfold in a little over three years."

Some trunk lines are trying to give up stops that are unprofitable for their large equipment because they believe locals can deliver better and more economical service, but local community groups fight hard to keep the town's place on the main line. "It's a matter more of civic pride than logic," was the cryptic remark of one midwestern town official.

What about the road ahead? There are problems that may slow progress of the local carriers in their effort to bring first class air service to your Main Street. First factor to consider is the tender age of the local service group. The locals were not given their final birth certificates by the Civil Aeronautics Board until 1947. Prior to that time—1944 and 1945 for the early birds; 1946 and 1947 for others—they were operating on trial. Twenty started and 13 won out.

Thus, in ten years this infant group of operators expanded faster than their equipment and capability permitted. The Main Streets wanted air transportation and passengers clambered aboard to prove it. They demonstrated pioneering spirit too by riding the venerable DC-3 when the trunks were offering deluxe accommodations. Old as the planes were, they did (*Continued on page* 80)

Left: Displaying a huge fuchsia and gold hibiscus on the tail and a pink orchid on the nose, Allegheny Airlines' Napier powered turboprop Convair carries its salute to Hawaiian statehood.



Feeder airline routes across the U. S. bring millions of Americans within reach of regular airline service, link smaller communities with one another and with major trading centers.

BEWARE, GULLIBLE TRAVELERS!

By HOWARD PIPER
Vice President—Research and Development, Piper Aircraft Corporation

The author, Howard "Pug" Piper.

THE ADJECTIVE "GULLIBLE" in the title of this article is intended to be applied not to all travelers, but to those who do their traveling in utility airplanes. This group is, of course, no more gullible than any other segment of the American population, so far as its willingness to believe what it is told in advertisements, other published statements, or verbal statements, is concerned, but it is interesting and, we hope, illuminating to observe how and why the aviation public is being misled continually this way.

What I am referring to is the very strong tendency in our field of utility aviation, for most parties, including the manufacturers, the sales organizations, and the pilots, to exaggerate the performance data of airplanes. This is unfortunate because, in the first place, it is misleading the public, and secondly it establishes reputations within the industry for a lack of reliability.

Almost all of us have been guilty, at one time or another, of this regrettable practice, either intentionally or inadvertently. This was perhaps particularly true back in the days when our business wasn't much of a business. Now that the whole field has attained a considerable measure of maturity and respectability, it is time that we cut out the practice of issuing misleading information.

I realize that this is about the same as suggesting that fishermen stop exaggerating the size of their catches. In the case of the fishermen, however, no harm is done in this case, considerable harm can result from the exaggeration.

Our company has adopted the firm and stated policy, starting specifically with the advent of the Apache in 1954, of insisting on figures which are either completely accurate to the best of our ability to determine them, or slightly conservative. For example, the cruising speed of the Custom Apache was determined in tests of the first two production airplanes to be 172 mph at gross weight at 75 per cent power at optimum altitude. This was listed in the specifications as 170 mph. The sea level cruising speed at 75 per cent power, which is the commonly used maximum cruising power setting, was also given to avoid

The tendency to exaggerate aircraft performance data is deplored, in a candid commentary, by an executive of a leading lightplane manufacturer.

the implication that the airplane would cruise 170 mph at sea level. Cruising speeds for lower power settings were shown by means of charts in brochures and operating handbooks. Other performance data was equally accurate or conservative.

The published specifications were given not for a bare airplane at light weight, but for a moderately equipped airplane at gross weight, to keep the data representative of what would be attained on the average airplane.

It seems only reasonable that a manufacturer would present accurate or conservative data on its products, but this is not always the case. The difficulty is that, in order to keep a new model competitive from the specification standpoint with similar competing aircraft, it is necessary to show performance data that is not unfavorable. If the competition exaggerates its data, there is strong pressure from various sources to show exaggerated figures on the new model.

As a hypothetical example, one manufacturer may have a twin engine model that he claims cruises at 220 mph, although in actual use it will make 205 mph. A competing manufacturer with an almost identical plane, in order to give his airplane a sales edge, will claim 225 mph for his model. Then the first company, on the basis of a slight model change, will show 230 mph for its airplane which by now may do 210 mph. The only limit to this sort of thing, which goes on in all classes of aircraft, is the point at which the figures are so far out of line that they are obviously distorted.

This type of exaggeration has been carried on even when there was no competitive situation, just to make the airplane in question sound more appealing. Occasionally, a model may have a field all to itself, just as our Apache does more or less at present. Even then, the original specifications may be high, and each time the model is changed by adding more horsepower or otherwise, the figures are exaggerated again. This might be done to make the new version more appealing than the old, to stimulate trade-ins.

The cruising speeds are the figures that are most commonly exaggerated, because they are the ones of most interest to the potential customers. However, rate of climb, stalling speed, take-off and landing distances, empty weight and useful load figures—all are frequently misleading.

Some companies even go to the extent of "guaranteeing" their performance figures, plus or minus a small per cent, although they know that their model will in most cases not meet the guarantied figure, even after the allowed tolerance is deducted. The odd part about this is that hardly anyone ever challenges the figures. If this should happen, the manufacturer can present several alibis which are hard to refute: (1) The airplane is not equipped as a "standard" airplane (very few are), (2) The pilot is not operating the airplane as proficiently as a company test pilot would, (3) The airplane or engine has deteriorated somewhat in use and cannot be expected to be up to specifications at this stage.

Any or all of these excuses can, of course, be valid. The chances are quite good in many cases, however, that the airplane would not meet the specifications if all the necessary conditions were met.

Production aircraft can and do vary in performance, because of production tolerances in the airframes and engines, but if performance guarantees are given, the variations should be considered, and the worst of the airplanes should fall within the guarantied figures.

One of the reasons that there is not more criticism on the subject of misleading performance claims, aside from the general and accepted feeling that everyone exaggerates so this is to be expected, is the fact that it is quite difficult for the average owner to determine what his performance actually is. If an airplane doesn't seem to make good in cross-country trips the cruising speed that is claimed for it, there is always the head wind, or perhaps the reduced power setting, to be blamed. Most operation of lightplanes seems to be unscientific enough so that the pilot really doesn't know whether he is getting specification performance or not. This is undoubtedly the main reason why many parties feel that they can get away with distorted specifications.

An example of the lack of intelligent observation on the part of many pilots is the general misconception of the accuracy of airspeed indications. A common question, in connection with the operation of a new model is "What does it indicate?", meaning presumably what does the airspeed normally indicate. Actually, this indication does not necessarily mean a thing.

In the first place, evidently many newer pilots do not realize that the airspeed indication has to be corrected for temperature and altitude. Most pilots do not have computers for this purpose, or do not have the necessary outside air temperature gauges on their airplanes to enable them to use the computers. Without these computations, the indication means very little.

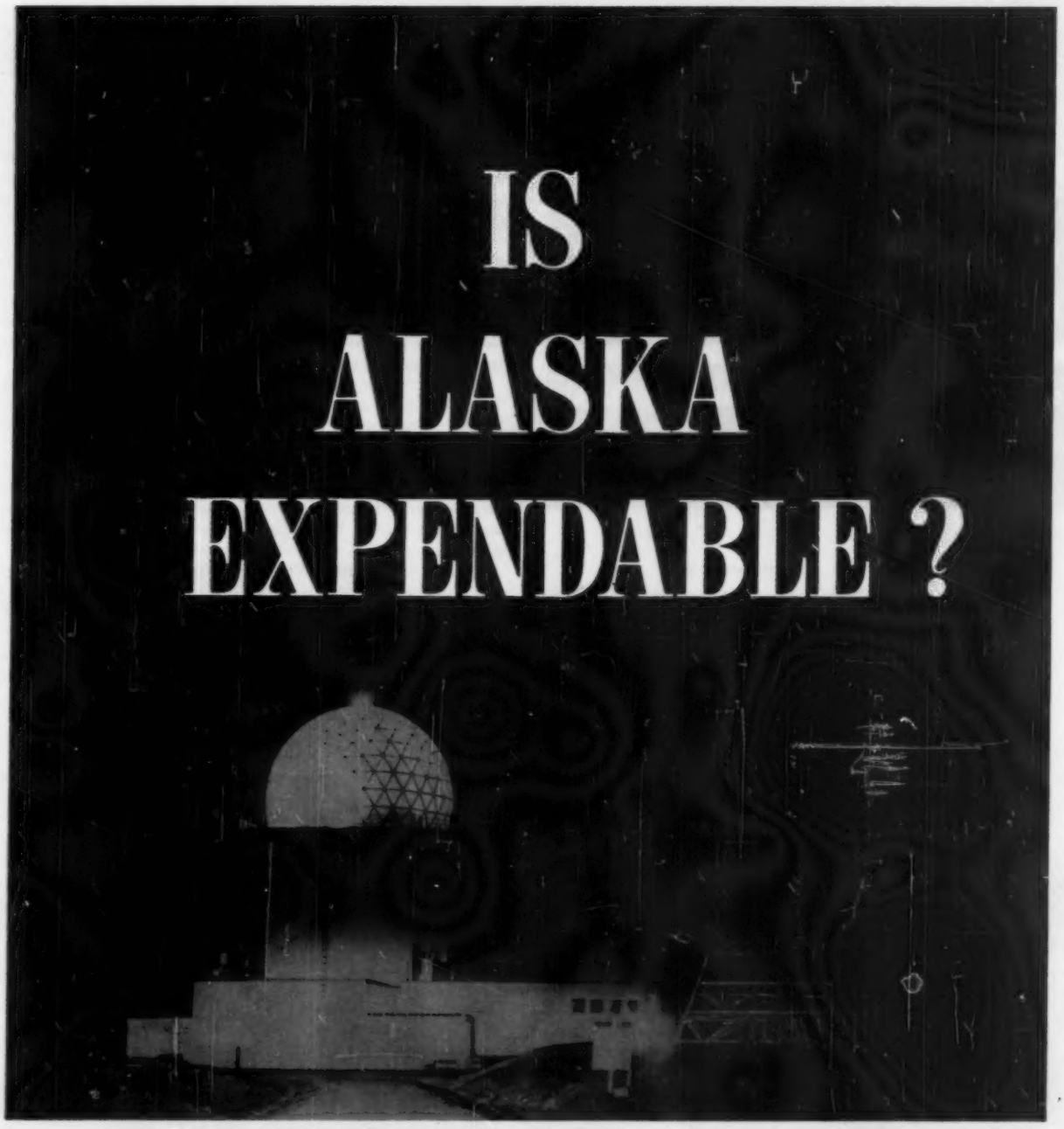
Secondly, the airspeed indication depends directly on the engine power settings, among other factors, so that without a specified power setting no answer can be given to "What does it indicate?"

In the third place, an airspeed system can very easily become, or be put, out of adjustment so that it is no longer accurate, if indeed it ever was.

When an airplane is advertised to cruise 150 mph, some pilots expect it to indicate that figure regardless of altitude or temperature. To accommodate these pilots, instead of trying to educate them, some operators follow the practice of "stepping up the airspeed." This is very easily done, and frequently brings the desired result by making the pilot satisfied with what he reads on the indicator.

A few years ago, one of the earliest Apaches went to a sales agent who was not satis- (*Continued on page 54*)

IS ALASKA EXPENDABLE ?



IS ALASKA expendable?

Are Alaska's defenses adequate for its survival in case of sudden attack from across the Bering Strait?

A startling reply to these vital questions came from none other than the commander of Alaska's joint services defense force, Lt. Gen. Frank A. Armstrong, Jr. The veteran airman and air strategist spoke forcefully thus: "As things now stand, it would take only two enemy bombers to put Alaskan bases out of action. If these attacks were followed up with paratroop landings, Alaska itself would be lost.

"With Russians in the Fairbanks and Anchorage areas, President Eisenhower would have to decide quickly whether to bomb Alaska or leave the rest of the country open to close range attack from Red troops along the Yukon."

He followed with this dire prediction: "If Alaska doesn't get IRBM (intermediate range ballistic missiles) soon, we're going to be in one hell of a fix!"

Alaska's civilian voice echoed Armstrong's statements. The state's energetic and hard working U. S. Senator, the Hon. E. L. "Bob" Bartlett, said, "It's shocking to learn that Alaska has what amounts to no defense at all. It's nothing more than a paper defense."

Kip Hiddleston, president of Anchorage's lively Chamber of Commerce commented, "Until this warning was sounded, I didn't realize that Alaska means so much to the security of our sister states below the 49th parallel.

Polar projection map shows why the military puts a high priority tag on Alaskan bases, only miles away from the USSR. Note the location and relationship of Asia, Europe and North America.

Destined to become the gateway to Polar Air Passage, our 49th state is a natural bastion for freedom at the top of the world.

By DAVE LEWIS

However, I have known that we Alaskans are mighty sensitive and vulnerable."

General Armstrong, who has served two tours of command duty in Alaska and is well versed on its heritage, its military complexities and its natural assets, sums up the mission of his command, this way:

"As it stands today, our mission is to alarm the U. S., not to defend it."

According to the best military analysts, the threat to this top of the world area, the growing strength of Red bases in neighboring Siberia, is such that the Red forces can well choose their own good time and method of attack. They can literally push the U. S. off this strategic and sensitive polar position at will, leaving its northward flank exposed and defenseless. Alaska is strategic because of its commanding location. Changing military strategy being brought about by the advent of missiles, satellites and jet transports, make it imperative that this factor be given proper importance in Defense Department development of our pattern for security.

At the moment there are 26 bases in Siberia armed with aircraft missiles that are capable of striking at the heart of the U. S. from the top of the world. They are reportedly growing in strength every day.

In the event of a surprise attack, these same experts estimate that our own Strategic Air Command bomber force would be able to immobilize only eight of these Red bases leaving the rest to launch second wave destruction upon the U. S.

They are also confident that Alaska, as it is now equipped, would either be bypassed or wiped out in the first blast. In either case it would instantly cease to perform a useful service.

This is exactly what Alaskans, its members of the armed forces, and General Armstrong, seek to avoid.

What then is the present line-up of weapons? What is proposed, and what does military leadership think modernization can do to strengthen Alaska's overall position?

First of all, General Armstrong reports that there are at present three U. S. Air Force units stationed within the former territory, all within the Anchorage-Fairbanks region. Two all-weather interceptor squadrons are standing alert duty, one F-102 unit is at Elmendorf AFB and the other, an F-89 outfit, is at Ladd AFB. Strategic Air Command has a rotational B-47 jet bomber force operating off of Eielson AFB.

Besides these three operational combat units, the remainder of the USAF units provide non-offensive services and perform logistic and supply operations.

At the moment, more than 100 early warning radar, weather and long range missile tracking stations are integrated into a cohesive detection system. It connects with the Canadian Dew Line at the eastern border of Alaska, runs westward along the Arctic slopes, down the coast and out the Aleutian chain to Attu.

The Army has Nike air defense missile installations giving close-in support to the air bases, a small security force at the principal air bases and a sizable cold weather training station at Fort Richardson, near Anchorage. Other small installations are positioned at Wildwood Station and at Fort Greeley. The latter is the Army's northernmost outpost.

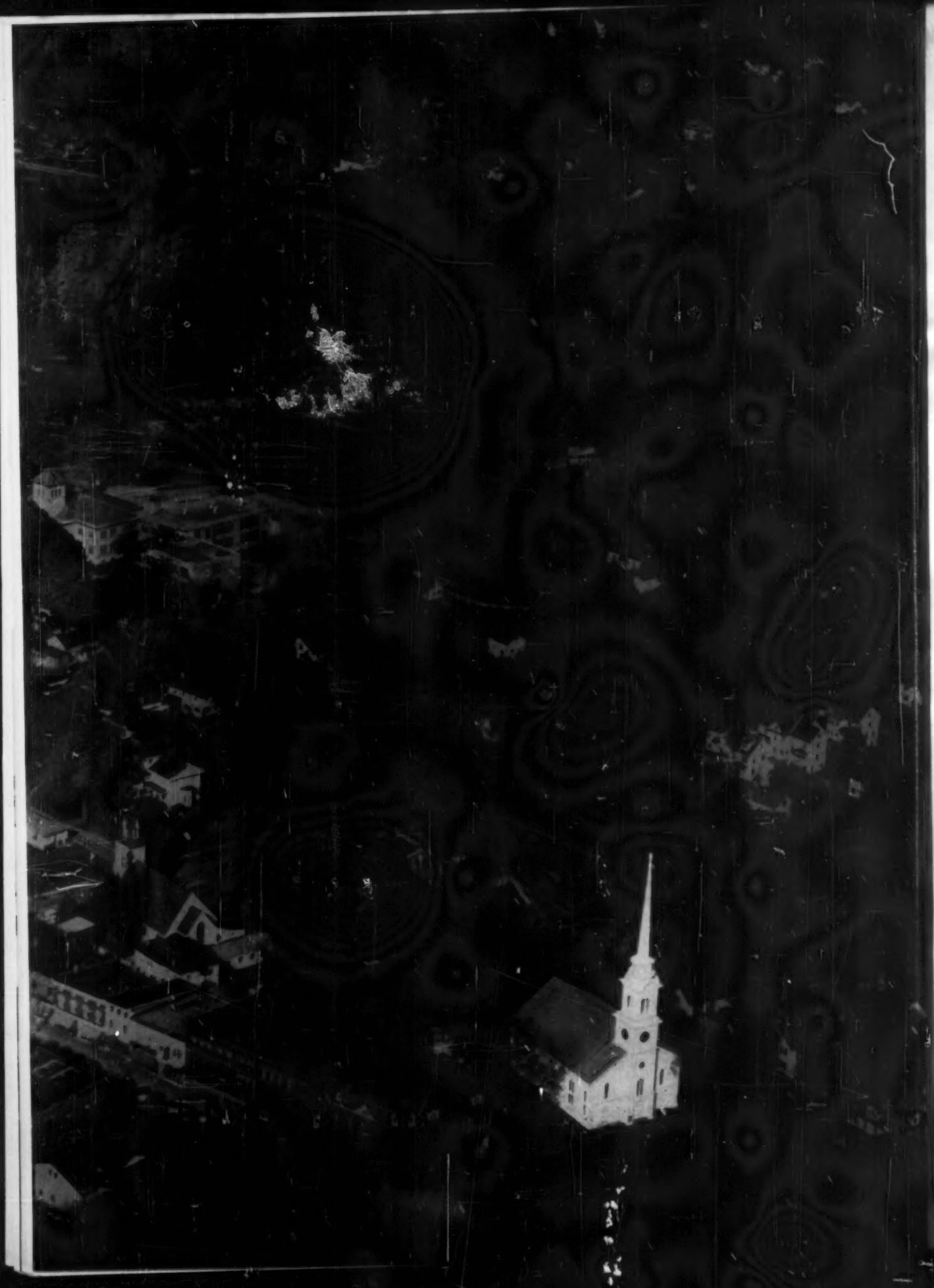
The U. S. Navy commands the Alaskan Sea Frontier and complements the land-based early warning radar network with picket ships and radar planes ranging over the cold and ice-bound waters surrounding Alaska's vast coastline.

It is self-evident that these forces are not designed to stop a surprise, aggressive act. They are, as presented, an alarm sounding organization and represent a sizable investment in military funds since the start of World War II. General Armstrong estimates that total dollar outlay to date amounts to about one-billion and a half dollars, with current operations requiring an annual funding of approximately $300,000,000.

What then should be done to wrap up this capital defense expenditure with proper protection, to say nothing about the far-reaching value of such action to stateside security?

Alaskan commanders want IRBMs and modern, nuclear weapon-carrying bombers of the F-105 type.

They are quick to point out that this does not mean a sizable increase in Alaskan-based manpower. This they say would tend to complicate the (*Continued on page 64*)



THE AIRMAN'S WORLD

THE RIDERS of the far high places have rewards. The curvature of the earth is a steely scimiter in a scabbard of space. The purple prairies reaching to infinity suggest a matchless loneliness. Far down in the bowl of atmosphere around the rim of which one swims are misty tracings to be identified as land or sea or cloud. And if night has perchance overtaken the journey, the stars seem touchable—dared one extend his hand.

But reward for threading trail beyond the power of earthborne eyes to follow is in terms of the awesome, the majestic, the mystic. The senses are aware of vast dimensions and cold heights. The beauty is without warmth and the peace is but a vacuum of sound and detail of sight.

It is not so with him who flies low and slow. His rewards are not for rivaling the lightning in speed or in climbing to where no cloud may follow. None the less they are considerable and most especially so when the autumnal equinox has signaled nature's exterior decorators to break out the royal colors in celebration of harvest and in preparation for the advent of Thanksgiving and the Yuletide.

Then the private pilot, or whomsoever will or can, may circle above a crimson and gold tapestry of maple and aspen, of bittersweet and sumac, of white birch and green hemlock and he may know the miracle of creation as truly as his professional brother who probes the place of the stars and thinks of the continents as his reference points for navigation.

I have seen the power and the glory of great nations and the pomp and circumstance of great wealth and the awesomeness of nature's handiwork around the world but never anywhere at any time have I seen a sight more remembered than a tiny white spire reaching up from the foliage of an American village in the autumn of the year. Who can not feel peace here does not understand peace. Who can not find God here need not look for Him among the stars.

GILL ROBB WILSON

In the heart of the rich Pennsylvania Dutch country, Reading Air Service has established a multi-million dollar business with a national reputation.

Those Live Wires at READING

THREE MEN POOLED talent, resources and energy in 1946 to raise what might have become three small, fixed base shops instead of one that has grown into a multi-million dollar business with a national reputation.

They were ex-Air Force captains and Air Transport Command pilots Alfred M. "Sime" Bertolet, R. Harding "Breity" Breihaupt and Brooks L. McElroy, who returned to their home town of Reading, Pa.

When they joined forces to organize Reading Air Service, Inc., at the town's municipal airport, old hands in aviation hinted that it would never work. Today, RAS is a 150-man organization with 120,000 square feet of factory area, in the heart of the rich Pennsylvania Dutch farm country. Earnings have grown from about $700,000 in 1946 to $2.9 million last year and $4 million plus in 1959.

In 13 years of successful but hectic operations, Reading Air Service has proved that a purely local, off-line location can win national clientele and support. Its management has shown that no obstacle is too big as long as the desire, drive and know-how is there to accomplish the mission.

Reading Air Service aims and objectives are those of all other airport operators fighting the competitive battle for survival. Its trials and tribulations, its successful techniques and programs, and its management's view of the road ahead can prove informative and valuable to the trade.

First, the way this threesome charted their future was unique and wise. Each of them wanted to stay in his hometown but did not want to eke out a meager existence fighting the others for the scraps of business then in prospect.

Bertolet, who is now president, Breihaupt who is vice president of sales, and McElroy, vice president and treasurer, were born within a 20-mile area. They had learned to fly about the same time—in the early 30s—and they had worked together.

Immediately prior to World War II, McElroy had taken on the flight operation concession at Reading's new municipal airport and Bertolet and Breihaupt worked for him, training students, selling airplanes and hustling for maintenance, gas and parts business.

When war was imminent, the airport was designated a Civilian Pilot Training center, with McElroy the contract operator.

Sime Bertolet says it wasn't long after the war started that McElroy was impelled to join the troops, so he sold out to Sime and Breity and took off for the Air Force and the Air Transport Command. Breity was the next to go; he in turn sold out to Sime. "Finally," Sime says, "It was too much for me too. So I took off. All three of us wound up in ATC."

In 1945 they sat down together to consider their future. The first essential was to stay at Reading and the second was to stay in aviation and still make money.

"We felt that it was much better for us to pool our talents and finances, than to compete with one another," Sime says, "so we secured supplementary financing, set up shop as Reading Air Service and went to work.

"Just last year we bought out our stockholders at $213 a share, double the original price."

Now Reading Air Service is wholly owned by its three officers. Bertolet describes the intervening 12-plus years as of great significance to the whole business—RAS made the same basic mistakes as most other fixed base operators and small plane manufacturers in 1945-48. "We dived head and foot into the great plane-in-every-garage mirage."

For example, there was the scramble to gather down payments on North American Navions at $1,000 each, but most prospective purchasers had bids out for three or more planes, inflating the market. RAS was committed for $117,000 in deposits and found itself far short of its goal when the balloon burst.

"Had it not been for a fine policy on the part of North American, we may not have weathered this first great threat to our survival," Bertolet says.

"Above everything else and despite economic developments, I think North American Aviation used great foresight in evaluating the market and in developing a sales plan. This planning has had a profound effect upon us and, in many ways, pioneered our way in the business and industrial plane sales field."

Bertolet summed up his company's 13-year history in this manner:

"We made plenty of mistakes but we made up our minds early as to which direction we were going.

"We knew that Reading's population and the surrounding rich farming country could not produce the business we needed. Our number one problem, then, was overcoming the drawbacks of our remote location from the heavy traffic terminals. Reading, a community of 115,000 people, just could not support us.

"In addition, obtaining personnel was a real problem. The trained specialists were already happily situated nearer the high traffic centers so we had to take a few key men in the area and train them ourselves. This has proven to be a wonderful asset, in that our men want to stay here, and this manpower stability and excellent employee attitude makes it possible for us to operate on consistently high performance capabilities."

The sales goal had to be broad and ambitious. RAS needed all kinds of work to build diversity. In addition to routine flight training, they began to add maintenance and overhaul shops. Airplane sales categories grew from the small two-place plane types to the Aero Commander and other twin-engined models. Engine overhaul shops have recently been established for the 450-hp class powerplants or less.

Five salesmen ply regular routes of contact throughout 13 states. Flying RAS planes, they have varied products to promote in electronics and mechanical systems. Salesmen specialize in new plane sales, used plane sales, radio and electronics equipment, engine overhaul, airplane overhaul and maintenance, refinishing, and cabin interiors.

In Sime's own words, "We're in business to render a service for a fair return on our effort. We will merchandise any line of products which help us achieve this end. This is why we set up for engine overhaul."

An interesting illustration of this philosophy is RAS's commuter service from Reading to New York. Using de-Havilland Doves, the "New York Express" for area businessmen and women at $20 a head departs Reading at 8:00 a.m., arriving at Newark 60 minutes later. The return flight departs Newark at about 6:00 p.m., permitting passengers to open their Reading front doors around 7:15 p.m.

Bertolet insists that this four-day-a-week service is not designed to forge an airline route but to utilize equipment that is economical and available, (*Continued on page* 78)

The success story of three fixed-base flight operators who joined forces to build a multi-million dollar b··siness.

By FLYING STAFF

HUMAN ENGINEERING FOR THE FIRST FLIGHT

THE BISHOP'S BOYS

By DALLAS SHERMAN

INTRODUCTION Today, as we face the definite prospects of space exploration, many men are concerned with many questions. Some are troubled by one question in particular.

Scientist T. F. Walkowicz, M.I.T. graduate and member of the Rockefeller Staff, in his March, 1959 address to the American Rocket Society, phrased it in these terms:

"Can it be that man's initial encounters with the cosmic might induce an at first imperceptible mutation through which the good Lord begins gradually to return unto Himself that free will and intelligence which have set man apart from the animals, and with which man has so tried the good Lord's patience down through the ages?"

The story to follow tells how this same question arose 60 years ago in the American Midwest, and how it was answered.

ORVILLE AND WILBUR WRIGHT were sons of a bishop.

The Reverend Bishop Milton Wright shepherded his flock from a modest church on Summit Street, in West-Side Dayton, Ohio. He sought to hold them together with strong faith: He believed in the dignity of man; in man's kinship with God; in his limitless capacity to climb toward God; in his freedom to influence his own destiny through the intelligent discoveries of God's will.

These were heroic beliefs for the late 19th century in provincial Midwest America. Despite its strength and bravery, faith like this relegated a man to the dreamy, impractical, head-in-the-clouds category. Such a fellow couldn't keep both feet on the ground, like a practical man-of-the-world must.

Bishop Wright was a good man—all right in his place. His place was in the church. He was not to be taken seriously in the places of business, nor during the weekdays. The principal private business was saloon keeping, and of course the good Bishop, although born the son of a small whiskey maker in Indiana, was now a total abstainer who suggested similar restraint to one and all. Bishop Wright had been converted in his youth as he labored alone in his father's field, and gone to far-off Oregon Territory as a missionary to the American Indians. Whether now he looked upon the Midwest as a mission area, in the oil-lamp era before the gay '90s, remained his own secret.

The important thing is that missionaries have a special knack of passing on their best qualities to their children. You can entertain yourself by fingering through "Who's Who" and noting what a high proportion of today's great are the children of clergy or missionaries.

But not all children catch the light from a father's fire. The oldest son, Ruchlin, and the next, Lorin, faded rather early from our view, and there were the twins who died in infancy. It remained for the two younger sons, Wilbur and Orville, and their baby sister, Katherine, to preserve the flame, and carry it high and far.

Another special knack of impractical missionaries is the prompt selection of practical mates. A classmate of Milton Wright, when he was a student at Hartsville College, Indiana, was Susan Catherine Koerner, daughter of a German-born carriage maker. Susan grew up surrounded with the tools that made surreys with the fringe on

top, and she developed a skill at using them. She caught the meaning of man-made conveyances. She saw that her father's carriages enlarged the area of people's lives. Susan Koerner was a practical, pioneer woman, and she tied her life to that of a dreamy, slow-moving student: She became Mrs. Milton Wright.

When Wilbur and Orville were little tots, their mother built them a sled, with sturdy, light wooden frame and delicately curved metal runners. It was a practical conveyance, to help them get to school and back. Then, she presented them with the tools she had used to make it. Little daughter Katherine, before she reached her teens, was taught to sew dresses and suits on bias cuts and given free access to her mother's treasured Singer sewing machine.

And what was the Bishop's present to his sons? When Wilbur was 11 and Orville seven, he gave them a ready-made fluttering toy, of no practical use on earth. It cost only a few pennies, but it was amusing to watch this little man-made gadget make like a humming bird. It was not a kite, so popular with kids of those days, which hangs in the sky on a string because of its resistance to the wind. It was not a balloon which floats in the air because it encases a miniature cloud. It was certainly not a glider nor an airplane because it had no wings. It was what we call a model helicopter —descended from a centuries-old sketch by Leonardo da Vinci. The principle was simple enough: a twisted rubber band that counter-rotates a couple of light paddle-wheels in horizontal planes, catching the air and throwing it downward. The machine is thereby pushed upward, in accord with God's law of equal and opposite reactions—which Mr. Newton had thoughtfully formularized. The boys learned its lesson well. They were both apt students, with phenomenal memories, like their father's.

IF WE had to classify the brothers, they would both be introverts, but Orville not so much. In contrast with Wilbur, Orville appeared more like a militant extrovert. Mrs. Wright observed, "Orv is quick, eager, alert—the grass will never grow under his feet—yet his mind will develop and grow until he is 50. Wilbur is different; he will mature quickly." Orville liked to play soldier—outdoors where there were real hills and valleys for maneuvering. Once, for realism, he set fire to the back fence, and despite the discipline that followed, he loved fire all his life. Wilbur stayed indoors, reading "Plutarch's Lives" as background for his brother's strategy.

Orville had an uncanny sense of personal bal-

". . . a model wing and Orville was checking its behaviour on the bike handlebars as he whizzed down Germantown hill."

ance and effective application of his physical power. He soon became the best and fastest bicycle rider for miles around. He won many races; copped the YMCA champ's medal. He could hold his lead with any bike, in any condition. If the steering was stiff, he whipped around turns

". . . on the stormy day of December 17, 1903 . . . Orville made the first powered flight from the surface of the earth."

using balance only. If the chain skipped, Orville just balanced more alertly and pedaled a little harder. Wherever they went, it was Orville who bumped into problems first and saw clearest what they were running up against. Wilbur thought them through and theorized the proper solutions.

IN ADDITION to whatever inherent characteristics made Wilbur more introversive, he was older and carried more reflective experiences. The results of an ice-hockey accident which knocked out his upper front teeth and banged up his legs, kept him a semi-invalid for many years. To tag along after Orville, he had to give his bike more painstaking care than any other in Ohio. The steering fork and the pedal mechanism were kept practically frictionless, and the tension on the chain and spokes were constantly tuned to perfection. Wilbur could never be confident of his body, especially his legs, but his mind was limitless and his hands were those of a great surgeon. He could *feel* the strength of a piece of wood or metal, or the correctness of tension in a stretched chain, wire, or strip of fabric.

Different though they were, the boys shared many things, and rejected others as mutually unattractive. Each had a pet chicken, and together they loved the family cat, "Old Mom," and her never-ending line of kittens. There was a family garden plot, which neither they nor their father would work. They liked life better above the soil: their first joint venture was making, demonstrating and selling extra-high stilts to other kids of the neighborhood. Neither ever swore, smoked or drank. Wilbur was named for a Methodist and Orville for a Unitarian minister; both were deeply religious throughout their lives. On all occasions, they dressed conservatively, like deacons of the church. They adored their mother, and sister Katherine, whom they affectionately called "Sterchens"—from the German for "little sister." The three children became inseparable in unified response to the religious discipline and Christian guidance of their home. They became reticent at seeking or accepting the company of others. Indeed, they were satisfied to be different —even peculiar.

The Bishop shared his wife's recognition of the differences in his children and sought to guide them into productive paths for furthering the Lord's work. He sent Orville pedaling out West 3rd Street to Germantown Hill to gather wild flowers which Katherine arranged on the altar. He steered Wilbur into secretarial chores for the church.

ORVILLE was fascinated with the barren hill, where he could streak down on his bike at breakneck speed, with the rush of air pushing his head up. Best part of the ride was near the end, where the bouncing bike literally leaped into the air for a few fast feet. He fell in love with the lonely hilltop, where the clean wind always blew upward and birds circled without effort.

Wilbur meticulously kept the church financial accounts but was more taken by the ecclesiastical resolutions, and arguments, pro and con. He soon distinguished statements of fact from declarations of sentiment. From here, his agile mind made the logical step toward law. He discovered that some law is beyond words, and requires supplemental pictures. He liked that, especially when the sketches—like those of the new-fangled horseless carriages—showed how complicated things were made, and how they worked. Wilbur became one of the best-versed amateur patent authorities of his day.

Orville was seldom indoors. Wilbur was never quite up to Orville's pace, and that embarrassed both of them. Once, when Wilbur delayed their pace as they returned from winning a kite-flying contest at "the Pinnacles," they were caught in a roaring storm and ducked into an earth-floor barn. When the wind reached hurricane speed, off through the sky went the barn, piece by piece. It was a terrifying experience but Wilbur and Orville saw with their own eyes that, given enough wind, even a barn door would fly.

As in all other physical prowess, Orville surpassed Wilbur in the manly art of throwing rocks. They hurt Wilbur's sensitive hands, and his bum legs pulled him off balance. He couldn't hit the side of a barn. He didn't dare practice on his father's church, so he settled for just throwing rocks at random. One day random happened to be a pigeon. By sheer chance, Wilbur winged him. It was Wilbur's first brush with death, and it stirred both his heart and his mind.

With intense tenderness and thoroughness, Wilbur went over every bone, muscle and feather as he prepared the corpus delecti for burial. Nothing escaped his faultless feel or his analytical reasoning. He was all but overcome in the revela-

tion of similarities between this poor little bird's broken anatomy and his own.

Hadn't Carlyle observed, "Man is a biped without feathers"? Were there ever any bird-men? Could there have been—within God's laws? Had God decreed that birds may fly, but men may not—forever? . . . Take that kid brother of mine: With his physical power, his unshakable sense of dynamic balance, his thrill to blowing wind, and his unquenchable thirst for speed. Was there ever any more bird-man creature on earth than my brother Orville? Of course, Orville would laugh at talk like this, and it would be silly to mention it to anyone else—even father. . . . Maybe I'm going batty. Instead, I'd better bury this bird and forget it. . . . But Wilbur never forgot.

Almost without notice outside the close-knit family, Mrs. Susan Wright departed this world in 1889. Wilbur had helped Katherine nurse her through the long, losing battle with T.B. Now, Katherine literally stepped into her shoes as mother in the modest frame house at 7 South Hawthorne Street. Narrow little Hawthorne Street is divided into North and South by the main line of the Pennsylvania Railroad. Number 7 South is very close to the tracks and definitely on the "wrong side." The good Bishop carried on under his heavy load of loneliness. Katherine was more quiet than her mother, and while Wilbur and Orville still ostensibly lived at home, they were seldom there.

Without either having graduated from high school, they had opened a bicycle repair shop at 1127 West 3rd Street, and became completely absorbed in their partnership. Business hours were 6 a.m. to 10 p.m., six days a week. Competition alone would have forced this. They had to hold their own against 18 local bicycle makers and dealers, six repair shops, one tire-maker and one specialist enameler. That was the era of small business in America. Wilbur let the church books slide. He was in the shop all day and most of the night, forever sketching and tinkering on bike parts and other mechanical gadgets. In the shop, he could make anything—fix anything; but he never got around to fixing the leaky plumbing in the scanty family bathroom on South Hawthorne. Orville would pedal the three blocks home for meals, and bring back to the shop the little basket Katherine always had prepared for Wilbur. Without even standing for a stretch, Wilbur would munch his meals as he continued his work. For him, food was only fuel.

ORVILLE appreciated fully that, in Wilbur's hands, their partnership held unsurpassed mechanical potential. Those priceless hands could make or repair anything! In his own way, Orville worshipped Wilbur. So Orville was more than content to be the outside man, rounding up the customers and flushing them into the shop. Never mind that he never had time to read—Wilbur read everything, including such stuff as that French professor Marey's book on "Animal Mechanism" that tells how apes walk and birds fly. Never mind what a complicated mechanical problem Orville brought in—tell Wilbur about it, and it was good as licked. The boys were beginning to click in concert.

No bike left the Wright shop unless and until it was better than new. Orville brought in lots of customers, and Wilbur more than satisfied them all. Wright-repaired bikes became respected as "Wright bicycles." Within a few years, the partners had hired young Charlie Taylor and other help. They started manufacturing bicycles from scratch and marketing them as "Wright Flyers." The partnership prospered mightily. In the small-business field, they reached the top by 1897. At this height, each hesitated in his own way, and together they looked around for life's next opportunity. They didn't have to look far.

Naturally, they looked first at their own shop. From the strong, light ash wood used in wheel rims; from the light steel tubing that carries the compression stress in bike frames; from the tiny spring-steel spoke wire that holds tension loads so easily, and from the flexible chains that transmit power so efficiently from clutch to sprocket, they saw far beyond any bicycle ever built. They visualized a conveyance of unbelievable strength-to-weight ratio that would give men speed and freedom of movement equal to their fanciest dream. All this was within easy sight; within the close walls of their Dayton shop. It never occurred to either of them to look to Washington, or anywhere else for any kind of material help.

Then, they looked at each other. You have had hints of what there was in each for the other to see. They saw it: all. They confirmed their common view of life: while to most men the most glorious sight on earth was a little girl skipping hand-in-hand with her mother, these two agreed on a big white bird soaring freely in the clear blue sky. If these two young men, with so much in common but so different in capabilities, were to join unreservedly in solution of any mechanical problem, you could check it off then and there. It was obvious that the sum total of their joint lives equaled the reason- (*Continued on page 86*)

"When he was 82, Mr. Milton Wright—former Bishop—seated himself beside his son, Orville, on the lower wing of a Wright biplane for his first flight."

Anything ever created by human hands has a built-in capacity to go off kilter. And when is the best time to lick those failures?

Lick electronic failures

By CHARLES O. PEACOCK

President, Aircraft Electronics Association

"Any noticeable drop in the unit's ability to 'reach out' is a sound reason for having it checked."

ONE OF THE FEW things you can say with absolute assurance about aircraft accidents—is the fact that they happen from a multitude of causes.

One startling thing is the fact that *such a minute proportion of them* are directly attributable to malfunctioning of electronic equipment in the aircraft!

The manufacturers of that equipment, as well as the service technicians who install and maintain it, are justly proud of that fact.

But anything ever created by human hands has a built-in capacity to go off kilter. At any time, for a multitude of reasons, any black box on your plane may fail to perform its designated function. And when's the best time to lick those failures? Before they happen!

Here are a few tips which may help you recognize the telltale signs which electronic equipment often displays before it ceases to function. (And let's face it—anyone who does *not* believe in signs has no right flying an airplane!)

Under ordinary circumstances, your aircraft radio grows progressively weaker in proportion to its hours in use. Loss of amplitude (or reduction in signal strength) is the main thing to watch out for. A good rule-of-thumb to follow is to have your radio removed and bench-checked to manufacturers' specifications every 300 hours. Some companies recommend bench-checks every 100 hours.

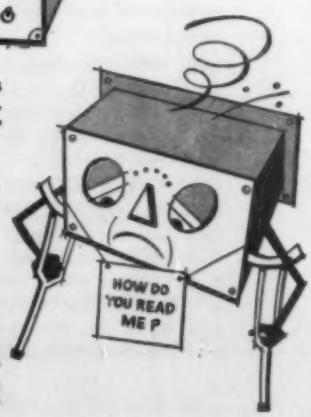
A receiver in top working order should bring in stations from 45 to 125 miles away, depending on its type. If it does not have this range, it may fail to deliver the goods just when you need it most. Any noticeable drop in the unit's ability to "reach out" is a sound reason for having it checked.

While a receiver often loses its efficiency by gradual stages, a transmitter, on the other hand, may become unreliable at any time—often without the operator knowing it. Make it a practice to ask the receiving station, from time to time, "How do you read me?" If your transmission is broken, garbled or weak, the fault should be remedied without delay.

The main bug to look for in a navigation receiver is a sudden drop in accuracy. If you suspect that your NR is suffering from error-itis, check your FAA Airman's Guide which contains a list of check points that pilots may use to verify the accuracy of this unit. Periodic checks of this nature are a basic part of good flying practice and constitute an economical form of safety insurance.

The job of testing your OMNI for reliability may be accomplished in a matter of minutes. Simply verify that the "to" and "from" bearings are within plus or minus four per cent of 180 degrees of each other.

"... your aircraft radio grows progressively weaker in proportion to its hours in use."



"Make it a practice to ask the receiving station from time to time, 'How do you read me?' "

before they happen!

"...being led to the left or right of the course when making an approach to a runway."

If you find yourself being led to the left or right of your course, when making an approach to a runway, you might well look to your localizer receiver for the source of trouble.

As for your guide slope receiver, it gives a satisfactory indication from the outer marker inbound, when it is operating in good order. On such an indication, the warning flag (if receiver is equipped with one) will be out of sight. At the transition altitude, as you cross the outer marker inbound, the horizontal needle should be stationed *at dead center.*

When your craft is cruising at 5,000 feet, your marker receiver should emit a coded signal for approximately 45 seconds, as the plane passes over an airway marker. On an actual simulated instrument approach, this coded signal should last from 11 to 22 seconds as the plane passes over the ILS marker beacon. The duration periods of these coded signals often will provide a good indication as to whether your marker receiver is functioning up to par.

A malfunction of your ADF system may reveal itself when the ADF pointer does *not* reverse itself as the craft passes over a station. Other clues: you may notice that the ADF is not reaching out as far as it formerly did, or that it points to a specific station in an erratic, on-again-off-again manner.

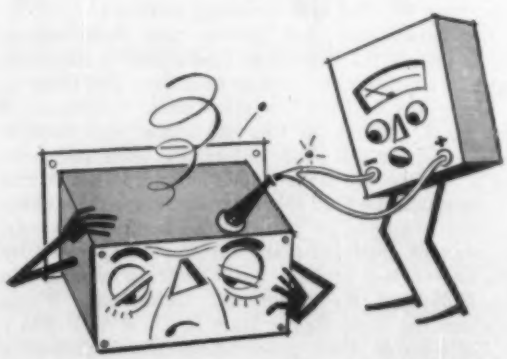
The complex electro-mechanical system by which the autopilot operates may, and often does, become sluggish with increased use. There is a quick, positive way to check up on your AP. First, manually override the auto-pilot; then release the controls—and observe how efficiently the craft regains its original attitude.

Defects in the radar system are often observable by the naked eye. As radar becomes less reliable, you will notice that the picture is not as detailed as formerly, especially for depth of distance.

Only on rare occasions does a major piece of electronic equipment go dead without any advance warning. In the vast majority of cases, your little black boxes will emit some kind of symptom that will let you know when all is not well. The above tips will help you spot those symptoms more readily. When they do occur, it is good flying practice, good business, and plain good sense to have the trouble remedied by a reputable, skilled, service technician who not only has the technical know-how to render top electronic servicing—but also the tools and equipment to do it with. END

EDITOR'S NOTE: *The Aircraft Electronic Association, of which Charles O. Peacock is President, is a nationwide organization of companies devoted to the installation, maintenance and repair of electronic equipment, primarily in business and private planes. A list of accredited A.E.A. members may be obtained without charge by writing: Aircraft Electronics Assn. % Michael Brand Associates, 12138 Victory Blvd., North Hollywood, Calif.*

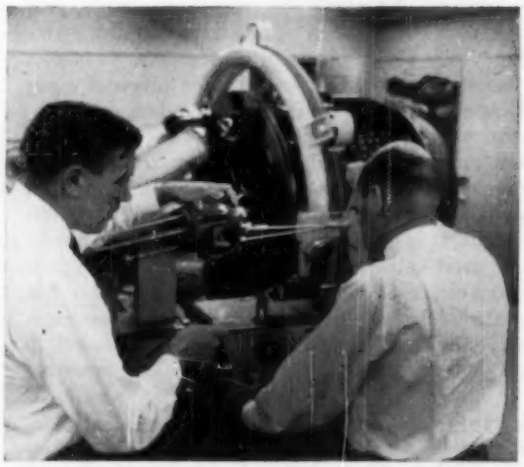
"...your little black boxes will emit some kind of symptom."



TRANSITION TO TURBINES – PART III By LOU DAVIS

Turboprop Maintenance and Servicing

.....where reliability and economy begins or ends.



Jack Morton, deputy chief instructor, Rolls-Royce (Canada) Dart school, uses the Dart engine fuel control sequence simulator to brief "student" pilot on fuel system control operations.

REALIZATION OF BRIGHT PROMISES of more economical flight for corporate turboprop aircraft will depend upon the cost and capability of engine-propeller maintenance and servicing facilities.

Early indications are that service and maintenance capability is pacing the growth of operational experience and effecting proportionate savings in dollars and time.

Since Rolls-Royce Dart engines have outdistanced American built engines in this particular category of power, any report on this phase of business plane use must of necessity feature the Rolls-Royce engine, its operating history to date and the field service maintenance and overhaul facilities available or planned for business owners.

At the moment, business plane turboprops operated by American enterprises include the Vickers Viscount, the Fairchild F-27 and the Grumman Gulfstream. These planes feature the Rolls-Royce Dart R. Da 6 or R. Da 7 engines. Rolls-Royce Dart powerplants which deliver a total effective horsepower of approximately 1,800 to 2,200, respectively, have accumulated more than eight million flying hours since the first engine entered service in 1953. This total flying time is expected to shoot past the ten-million mark by the end of December, and to 12-million by the end of '60.

A most effective means of measuring an engine's reliability and efficiency history is by its behavior during time between overhaul and the length of that period. The Rolls-Royce Dart R. Da 6, Mark 510 engine series started at 1,800 hours. Some models are now approaching 2,500 hours.

The higher rated later models R. Da 7 series, Mark 520, 525, and 528 started at 1,000 hours and are now approaching 2,000 hours limit as the engines reach various stages of operational proficiency with each major operator.

Airlines using Rolls-Royce-powered equipment in North America are: Trans-Canada, Maritime Central, Capital, Northeast, Continental, Piedmont, West Coast, Ozark, Pacific, Bonanza, Quebecair, Northern Consolidated, Wien Alaska, Aloha and Trans Mar de Cortes.

The only other turboprop engine now operating in airline transports in the U. S. and Canada today is the Allison 501-D13, which powers the Lockheed Electra. None of these engines is operating with B-Plane equipment at this time although some are scheduled for installation in converted Convair 340-440s for delivery in early '60. It is reported that Electra business plane sales are in the offing. Time between overhaul of the Allison 501-D13 is now 1,000 hours. The company reports a total of 800,000 commercial flying hours at the end of September and about the same for its military counterpart, the T56 engine series.

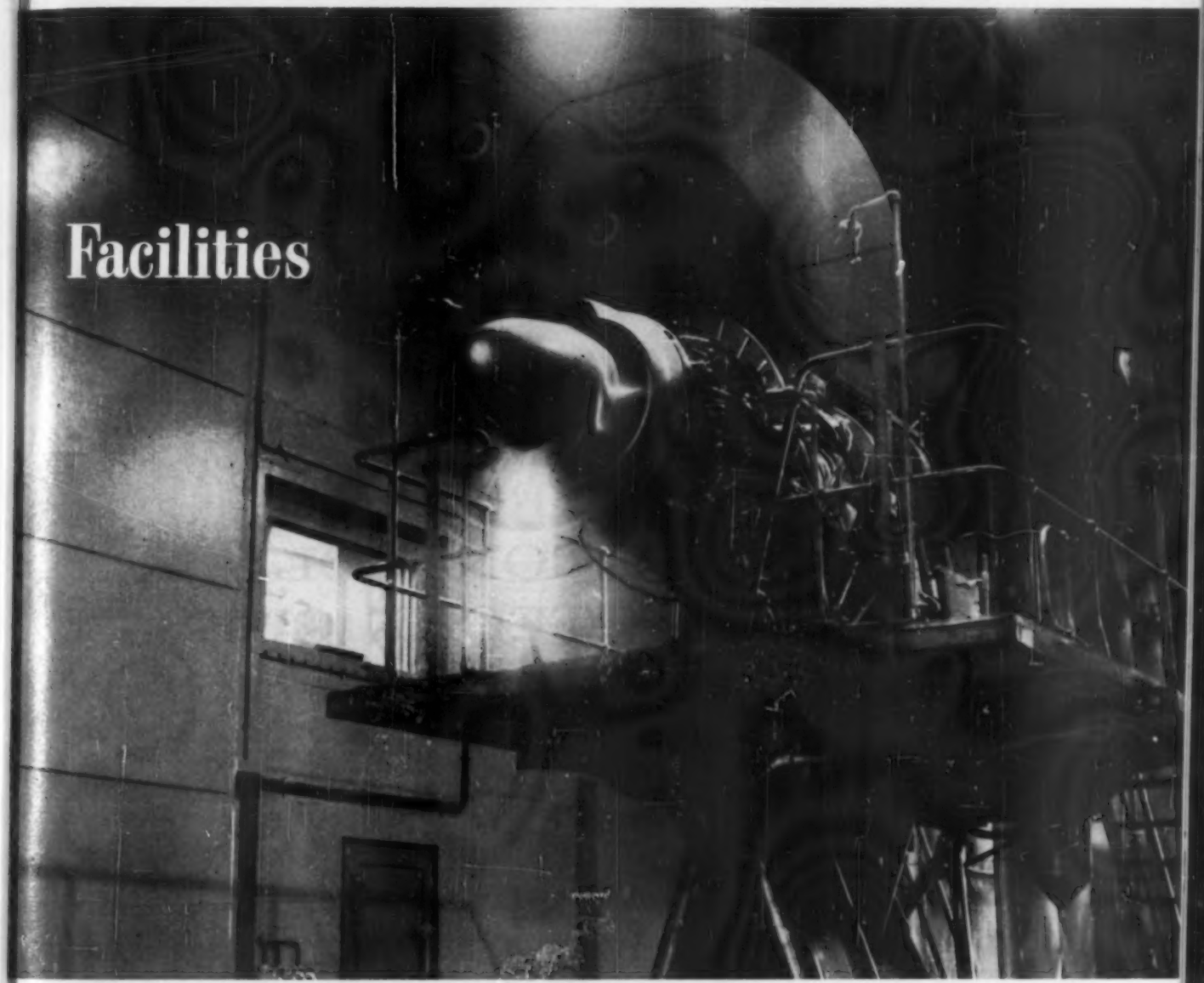
The Rolls-Royce R. Da 6 and 7 series of engines have established an enviable safety record and have played a major role in establishment of turbojet superiority over their piston-engined counterparts. One excellent example of this was reported by the Federal Aviation Agency:

"Over a 90-day period of operation on American domestic airline routes, the Dart has flown an average of 14,652 hours per failure, at least double the time recorded by an airline using the most modern piston engine."

Overall statistics provide a more detailed picture of this performance record. Although the figures reported here cover a period from 1953 to 1958 inclusive, the improvement trends are reported to be continuing:

- Unscheduled engine removal rate is 0.312 per 1,000 hours.
- Unscheduled engine removal rate falling under Rolls-

Facilities



Rolls-Royce Dart engines "... have established an enviable safety record and have played a major role in establishment of turbojet superiority ..."

Royce liability standards is 0.208 per 1,000 hours.

• Propeller feathering rate is 0.10 per 1,000 hours.

Piston engine featherings—precautionary and emergency—are about 14 times this rate.

Line and shop maintenance of the Rolls engines have been simplified through a concentrated program of improvement throughout the Dart engine's history. Major engine parts are now achieving some 7,000 to 8,000 hours of service. Burner cans, once a high replacement item, have now been showing comparable life reliability. Performance of propellers and accessories is improving in a like manner.

Long life of major parts has without question contributed to continued reduction of operating costs. The full impact of such advances costwise is expected to become more pronounced as U. S. operations time expands this coming year.

Rolls reports that line maintenance requires less than ten man-minutes per engine flying hour; the cost of consumable spares used in maintenance amounts to approximately 15 cents per engine flying hour.

During a recent discussion of maintenance, Rolls operators report that engine change time can be held to three to four hours.

To B-Plane operators, nearness of engine overhaul facilities is a matter of convenience and necessity, where one or two airplane fleets are involved. Shipping engines great distances eats up valuable days and may possibly mean keeping a plane on the ground for too long a period.

Recognizing this important factor, Rolls-Royce established regional maintenance and overhaul centers for the express purpose of serving corporate and business plane owners as the requirement develops.

Establishment of these centers eases the spare engine and engine parts inventory problems of single-plane operators.

(*Continued on page 70*)

THE PRO'S NEST

CRUISE CONTROL TECHNIQUES

Achieve increased safety and economy of operation in your lightplane by application of cruise control.

By TED DUROSKO

PART OF THE professional management which a skilled business, military or airline pilot exercises over his large, complicated airplane is the practice of cruise control. This technique has been developed over the years and it goes beyond just leaning the engine for efficient operation. It can be defined as a system of aircraft operation which will produce maximum economy and/or efficiency under the conditions dictated by the purpose of the flight.

Cruise control considerations include, in addition to fuel mixture economy, such factors as wear and tear on the engine, understanding of conditions which allow for maximum efficiency of the wings of the aircraft, aerodynamic cleanliness, and piloting practices which make the best use of engine power in the climb and upon establishing cruise.

As a result of applying cruise control techniques, you gain such advantages as an increase in range and the time an aircraft can stay aloft, decrease in fuel consumption per hour, less engine wear, and a direct and indirect financial saving.

In regard to flight safety, the advantages mentioned above reflect a wider selection of alternate airports when conducting IFR flights, increased engine life, and increased available fuel reserve.

Lightplanes can gain some of the advantages if the business or private plane pilot applies some of the same techniques. This is especially true for higher performance lightplanes which offer speed, high service ceilings, controllable pitch propellers, clean aerodynamic design, auxiliary fuel tanks for increased fuel capacity, and have been put through tests by the manufacturer to determine some of the necessary engine and flight performance data.

Let us wade through some of the somewhat technical points of cruise control and see how they can be applied to flying the Cessna 170, 182, Skylane, Tri-Pacer, Comanche, Bonanza, Mooney, Bellanca Cruisemaster, or whatever airplane you may fly.

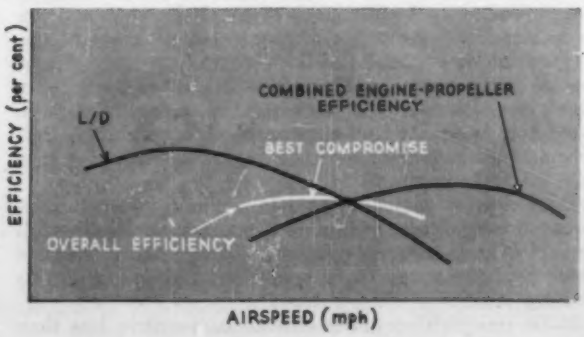
Perhaps it might be well to start with the factor of fuel economy since, this is a point which most all pilots see directly as they watch the dollars ring up on the gas pumps when refueling.

The textbook tells that fuel economy is based on a compromise between the aerodynamic efficiency of the airframe, the aerodynamic efficiency of the propeller, and the overall efficiency of the engine. (See Fig. 1) Quite a formidable statement—let's take it apart and look at each segment.

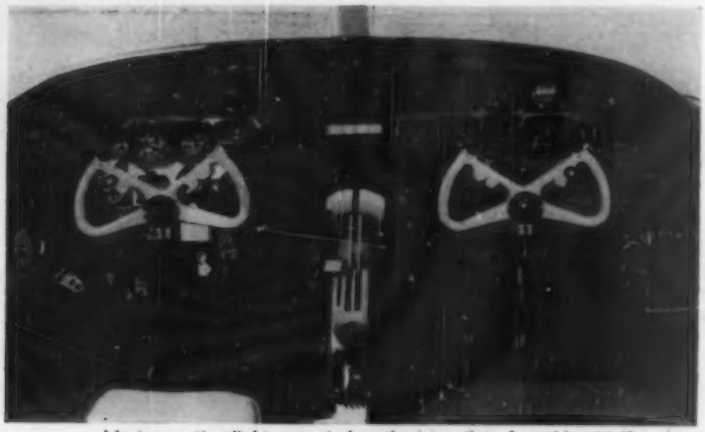
• *Aerodynamic efficiency of the airframe*—Quite logically, the design of the aircraft's wing contributes a major portion to the overall efficiency of the airframe. Every design of wing has one particular angle of attack at which it generates its greatest lift in proportion to the amount of drag it produces. This point, at which the wing is most efficient is indicated by the symbol L/D.

Airspeed and weight of the airplane are two factors that determine the angle of attack a (*Continued on page* 84)

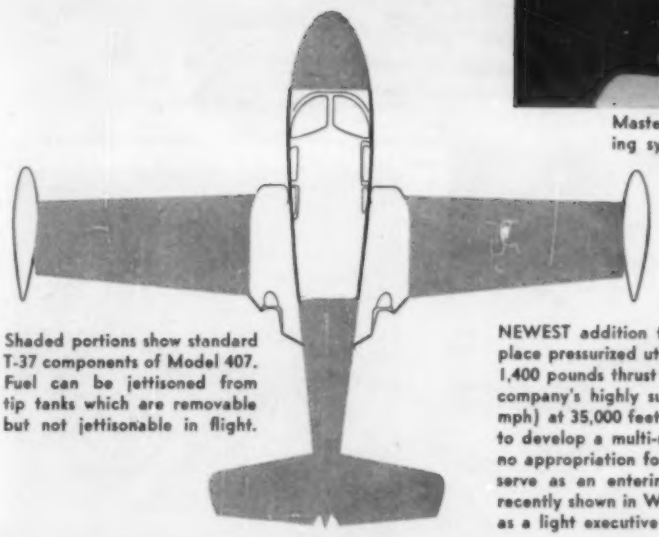
FIG. 1



FLYING NEWSREEL



Master caution light on main board warns pilot of trouble. Malfunctioning system is indicated in illuminated words on panel at extreme left.

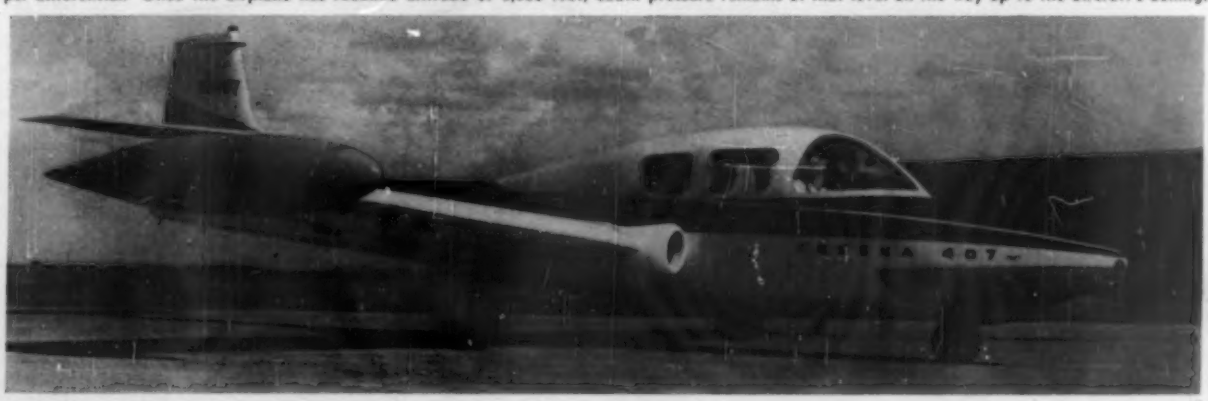


Shaded portions show standard T-37 components of Model 407. Fuel can be jettisoned from tip tanks which are removable but not jettisonable in flight.

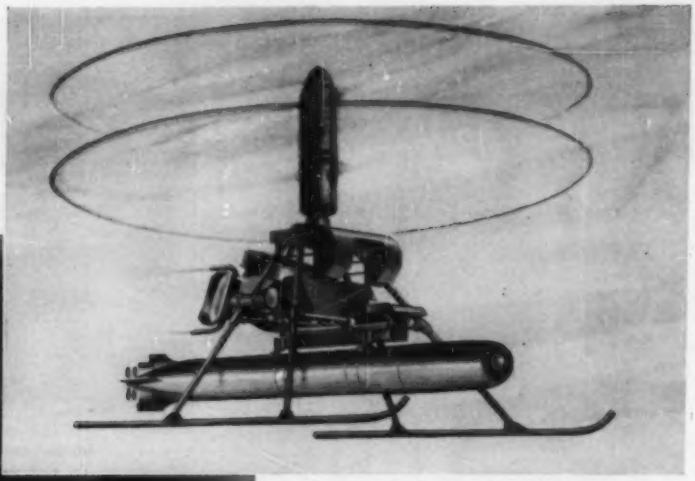
CESSNA'S FOUR PLACE JET

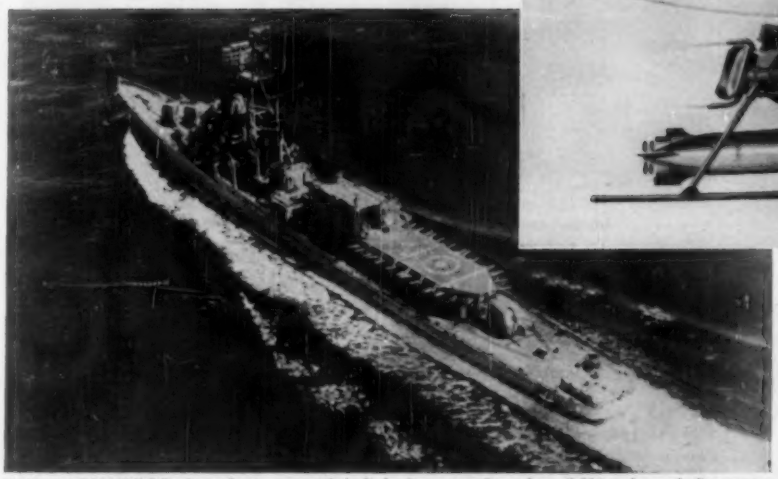
NEWEST addition to the line of light jet transports is the Cessna Model 407, four place pressurized utility aircraft powered by two Continental 356-9 turbojet engines of 1,400 pounds thrust each. It uses most of the standard components and systems of the company's highly successful T-37 jet trainer, has a cruising speed of 404 knots (464 mph) at 35,000 feet and a range of 1,380 miles. Model 407 is Cessna's private venture to develop a multi-mission, low cost jet which would fulfill military needs. As there is no appropriation for this particular type of aircraft, Cessna hopes that its new jet will serve as an entering wedge. The plane evoked considerable interest when it was recently shown in Washington to government officials. It may also have a bright future as a light executive jet transport, depending on its military acceptance.

Comparison study between T-37 trainer, top and Model 407, below. The parentage is evident. Model 407 has a constant pressurization system at 7.5 psi differential. Once the airplane has reached altitude of 8,000 feet, cabin pressure remains at that level all the way up to the aircraft's ceiling.



FLYING NEWSREEL

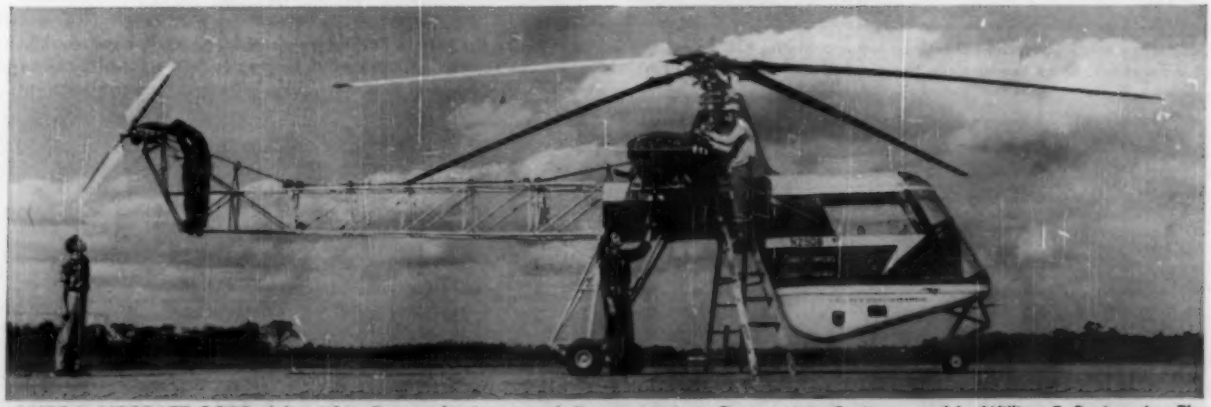




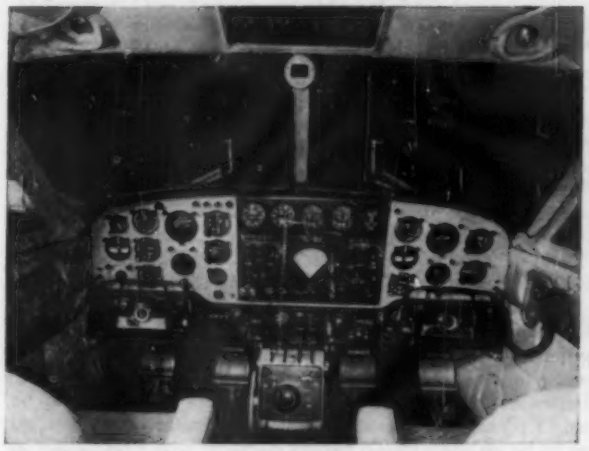
USS HAZELWOOD First destroyer with heli-deck carries Gyrodyne DSN-1 drone helicopters, shown above right. Copter is equipped with homing torpedo for anti-submarine warfare.

KAMAN HUSKIE Turbine-powered rescue helicopter about to go into service with the Air Force. Can carry eight passengers or four litters. Powered by Lycoming T-53 of 1,005 eshp.

FIRE FIGHTER Sikorsky S-58 owned by Okanagan Group of Canada, dumps 225 gallons of water saturating area 50 feet in diameter.



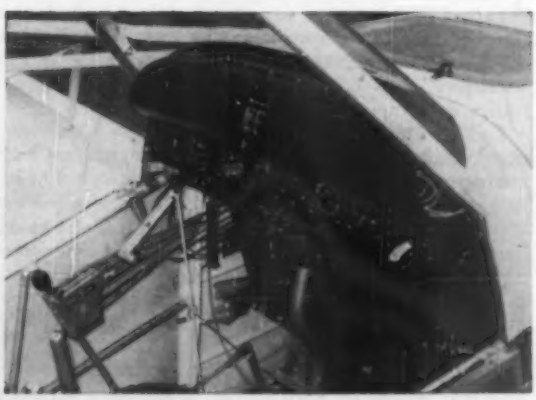
OMEGA AIRCRAFT CORP. delivered its first production crane helicopter to Aero Copters Aero Boeing owned by William E. Boeing, Jr. The BS-12D is powered by two 260-hp Lycoming engines, carries a payload of 1,000 lbs. slung aft of cabin. Ease of maintenance is outstanding feature.



QUEEN AIR, latest executive transport by Beech Aircraft Corp. Capable of carrying six passengers and 180 pounds of baggage, it has a cruising speed of 205 mph at 10,000 feet on 70 per cent power and a maximum range of 1,590 miles. The aircraft is fully instrumented for all weather flying and is equipped with weather surveillance radar. For the busy executive who seeks more productive hours during travel, the Queen Air's cabin is provided with conference room comfort. The airplane is powered by two supercharged 340-hp, fuel injection, Lycoming engines. Basic price is $120,000. Large entrance door with built-in steps acts as stairway when lowered. Baggage compartment is shelved for easy loading.

FLYING NEWSREEL

PIPER PAWNEE agricultural plane is now in full production at Piper's Lockhaven, Pa. plant. Photo at right shows rounded sheet metal buffer above instrument panel which prevents pilot's head from striking instruments in the event of a crash.



NO. 238

I learned about flying from that!

The ghost of a harrowing instrument flight haunted this pilot for years until he proved himself its master.

By ARTHUR B. MARSH

IN THE 50-ODD years that man has been flying, there has been one rule in instructing that has been emphasized perhaps over all others. When a student experienced an accident from which he was able to walk away, the instructor felt duty-bound to get him back into the air immediately to offset any fears that could impair his future usefulness as a pilot.

Endless stories have been told of pilots surviving VFR flight into instrument conditions. The participant and main character in these stories is usually so shaken that his usefulness as a fully capable pilot also is seriously impaired.

It is obviously impossible for one so caught to do as a basic student does and immediately repeat and correct his deficiencies. Meanwhile the fear remains smoldering until possibly the day when it can be extinguished once and for all. It can take years—and I can speak from personal experience.

To recount the instrument-flight episode that produced this fear would be boring. But I did offer thanks to my maker for deliverance from a near-fatal flight in which at one point my Swift was inverted. To the inherent ruggedness of this splendid little airplane, I owe my life and that of my wife.

That was back in '46. If ever I were to get the utility of my airplane for the business travel for which it was bought, some instrument flight would be necessary under as carefully selected conditions as possible.

Three years later I received my instrument rating. Several years more and I was to make the controlled ascent and descent through a stratus deck; a flight on instruments that I hoped would extinguish a smoldering fear that wouldn't leave. This flight, repeating the conditions that led to my near-fatal episode, was flown quite by accident. The occasion was a December flight to the splendid deer hunting areas of western Pennsylvania. My companion had gone ahead with the hunting gear in a car earlier in the week. I planned to meet him at Du Bois airport on a Saturday.

Saturday, the weather west of Allentown as far as Cleveland was socked in tight. I gave up until Sunday when weather predictions were reasonably good. They were forecasting scattered to broken with eight miles or better at Philipsburg, Pa., for the afternoon. Just to be safe I planned to leave Somerset Hills about 1:00 p.m., so as to be on the ground before dark—a wise precaution as it turned out.

Before leaving I took the precaution of applying a silicone wax to the propeller blade, front and rear. I used a standard liquid wax available for automobiles that has proven most effective and for this I was later most thankful.

The weather sequence at 12:45 p.m. was the same so it appeared a VFR flight could be made and a flight plan was filed to Philipsburg while over Allentown en route. Crossing the first ridge near Lehighton, 19 miles west of Allentown, it was necessary to fly between a broken-to-solid layer with tops at 5,000 feet and a high overcast I estimated at 10,000 feet. Visibility between these two decks was excellent.

It was 40 minutes before the Swift passed Selinsgrove after leaving Allentown. Normally this was a 30-minute flight. By this time the undercast was beginning to slope upward to meet the overcast not too many miles ahead. Minimum en route altitude was 4,000 feet. Obviously VFR had to be changed to IFR. I visualized delays and was prepared to return to Allentown if this occurred.

Snow static was beginning to be apparent on the low frequency receiver, another warning that all wasn't as predicted ahead. I was unable to read Selinsgrove, owing to static when they called with a clearance. Finally I contacted Philipsburg and received clearance to make a low frequency range approach to the airport.

This was a new one. I had planned on a VOR approach over the field with the south leg of the low frequency range as a check on the exact location of the airport. The PSB (Philipsburg) VOR was operating but minus identifier and it could not be used for navigational purposes.

I was at 6,000 feet when clearance was received and almost immediately went on instruments into the smoothest and most dense clouds I'd experienced. Soon afterward came the clearance to descend to 4,000 feet.

After passing through 5,000 and extending down to 4,000 feet, ice began to form rather rapidly; first on the propeller with noticeable roughness followed by smoothing out as the ice parted from the silicone-treated metal. I could breathe easier for I had full power. But now the leading edge of the wing and stabilizer and rudder picked up clear ice. I told the PSB operator we couldn't stand too much more of this condition but it was obvious that I couldn't come much lower with safety.

The wind worked out about 55 mph from the west and I experienced the exasperation of being pushed across the range legs in close and missing the low cone. A repeat performance was necessary and again the same thing. Fuel indicated about one hour's supply left so that wasn't much of a problem but the ice was building up and the windshield was better than one- (*Continued on page* 77)

Just released! All-new, advanced

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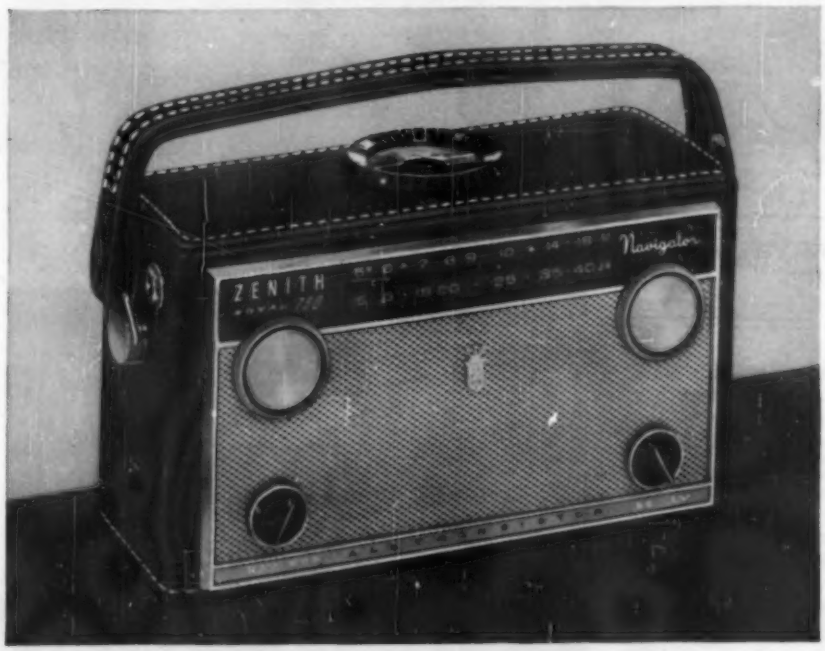
World's finest 2-band all-transistor portable

1. WEATHER BAND (150–400 KC)
for FAA weather reports, stand-by navigation use

2. STANDARD AM BAND
for super-sensitive long-distance reception



Self-powered stand-by navigation instrument! Homes accurately on FAA, standard broadcast and LF marine beacon stations. Azimuth scale for cross bearings. Nav switch cuts out AVC for sharp nulls and accurate LF range navigation. Precision Vernier tuning.

Special FAA weather service band (150-400 kc)! Super-sensitive LF band reception—powered to receive more distant range stations. Tuned RF stage with 3-gang condenser gives more sensitivity than many other radios—minimizes broadcast station interference on long wave band.

Standard broadcast performance where many others fail! Even weak distant stations come in sharp and clear. Push-pull amplification and Zenith quality speaker with Alnico 5 magnet provide big-set tone. Operates up to 350 hours on flashlight batteries.

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ALL THE FEATURES A PILOT'S PERSONAL RADIO SHOULD HAVE:

- **SUPER-SENSITIVE** reception in planes, trains, boats and autos
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The Royalty of television, stereophonic high fidelity instruments, phonographs, radios and hearing aids. 41 years of leadership in radionics exclusively.
**Manufacturer's suggested retail price without batteries. Prices and specifications subject to change without notice.*

At the sound of the alert, the aircraft commander is at the controls, ready to go.

LIVING ABOARD THE KC-135

KC-135 Stratotanker serves as home to an alert crew at a SAC base.

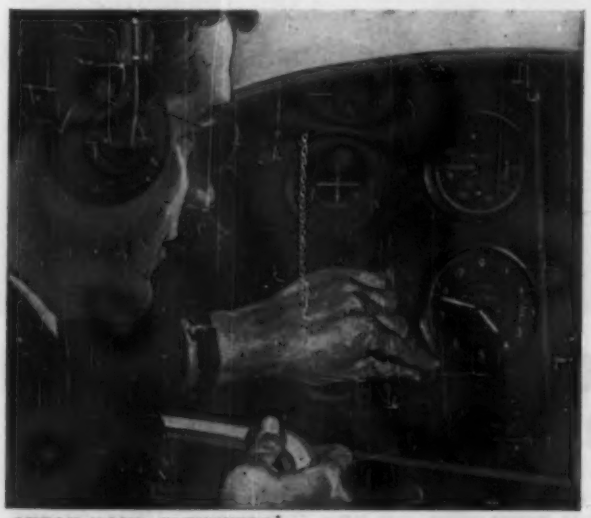
CONSTANTLY seeking ways to reduce reaction time to an alert situation, Strategic Air Command has developed an unique "live aboard" program for the crewmen of its Boeing KC-135 jet tankers stationed at SAC bases near the Arctic Circle. Crews live, eat and sleep in the airplanes parked on alert strips. The tankers are completely self-sufficient, are provided with comfortable living quarters and carry equipment for engine repair, maintenance and cargo loading. The KC-135 engines can be started without use of ground support equipment reducing considerably the time from alert to take-off. Living aboard has another advantage; the crews are spared walking and driving to the aircraft through the severe weather conditions of near Polar regions.

Left: A crewman adjusts control knobs on stove to regulate cabin heat. Above: It may not be luxurious but living quarters on the KC-135 provide all necessary comforts for crews on alert duty.

ESSO

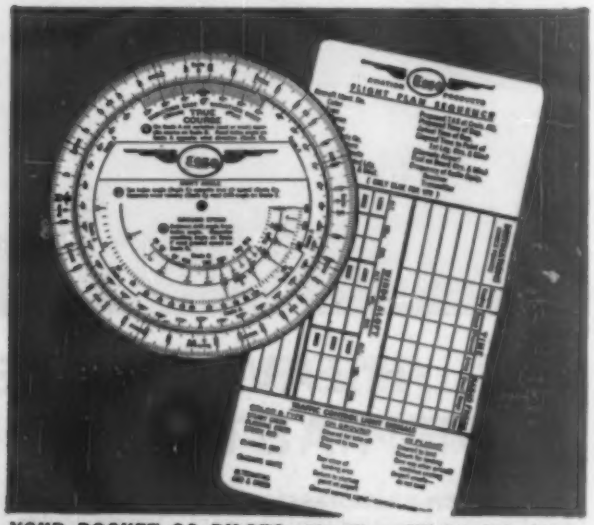
WING TIPS

KNOW WHAT'S RIGHT! Here's a new airway regulation you may not be aware of: *When flying on a low frequency airway, stay on the center "line."* Remember, too, that whatever line you fly, maintain your assigned altitude and keep alert for other planes – in all directions. Practice airway safety – as you do highway safety – it always pays.



CHECK YOUR ALTIMETER. In addition to a careful setting of your altimeter before take-off, be sure to check it en route particularly when flying into a low-pressure area because it will read higher than you actually are.

REMEMBER. For "Happy Flying"... look for the famous Esso Sign from Maine to Louisiana for the most dependable aviation products.



YOUR POCKET CO-PILOTS. The Esso Flight Calculator and Flight Plan Sequence Cards are two mighty useful friends. Use the Calculator to quickly solve problems covering speed, drift, course, fuel consumption and many others. The Sequence Card provides space for a complete flight plan outline. Made of plastic, it can be easily wiped clean for re-use. Just ask your Esso Aviation Dealer... They're free!

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PILOT-PROVED BY PROFESSIONALS
"Rough terrain's no problem for this rugged bush plane. You can drop those big Para-Lift flaps and set down on a postage-stamp-size landing strip. Plenty of power for short take-offs, too—even with a full load!"—Orville Luttrell, Pilot, New Mexico

POWERED WITH 230 DEPENDABLE HORSES
The new 4-place, *all-metal* Cessna 180 with a 6-cylinder, 230-h.p. Continental engine delivers your payload over a range of up to 675 miles at speeds up to 170 m.p.h. Climbs at 1,130 ft./min. to an above-the-weather 21,500-ft. service ceiling.

FOR PASSENGER OR CARGO Executive-styled interior makes it ideal for business flying. Seats can be removed in minutes for cargo! Carries a 1,120-lb. useful load. Extra convenience for easy loading: two yard-wide doors.

LANDS ON ROUGH FIELDS OR WATER—Standard spring-steel conventional landing gear with optional Goodyear castering wheels gives you safe, smooth rides over bumpy fields. Also available with floats, amphibious floats, or skis.

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LEVELAIR AUTOMATIC FLIGHT—developed for Cessna by *Tactair*—makes flying as easy as dialing your radio! Available as optional equipment.

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EASY-TO-FLY ALL-METAL CESSNA 150 FOR A RUNABOUT OR TRAINER

PILOT-PROVED BY PROFESSIONALS *"I can see how the new Cessna 150 is perfect for businessmen or student pilots. The High-Stability Wing makes it simple to control, and Land-O-Matic certainly simplifies landing! And for sportsmen—there's a big baggage compartment for equipment."—Ken Shotwell, Chief Pilot, Florida Power & Light Co.*

LOW PRICE AND 6¢-A-MILE OPERATION (based on *all* costs for flying 60,000 miles per year) have made the Cessna 150 the choice of many businessmen, rental operators, sportsmen, and flying instructors. Here are some of the other reasons:

LAND-O-MATIC takes over when you touch the ground. Makes landing almost like driving downhill! Other "easy driving" features: High-Stability Wing and Para-Lift flaps.

SIDE-BY-SIDE SEATING—with new instant-readability instrument panel—permits greatest ease of visual demonstration.

COMFORT-ENGINEERED CABIN—luxuriously styled with durable fabrics in your choice of 2 color combinations. Price: just $7,250 with std. equip., f.a.f. Wichita.

FOR DEMONSTRATION RIDES in any of the *nine* great new Cessna models, call your Cessna dealer now. (See Yellow Pages.) *Also ask him about finance and lease plans.* Or write: Cessna Aircraft Company, Dept. F-3, Wichita, Kansas. For extra services, look for the red and blue pennants.

Beware, Gullible Traveler

(Continued from page 29)

fied with the 160 mph indication he read on the airspeed, although this would compute out to the specified 170 plus mph. With a scratch awl, in a few minutes he had an indication of 180 mph, which would give a true airspeed under his conditions of over 190 mph. This pleased him, and at the same time made him look foolish in the eyes of most pilots evaluating the Apache. Obviously, this airplane wouldn't cruise 190 when the company advertised 170. He was promptly advised by the factory to put his airplane back in original condition.

Aside from indicating falsely because of atmospheric conditions, or because the airspeed system has been intentionally rigged to read high—and this is easily done by a number of methods—the airspeed can be off for other reasons. The instrument itself must have tolerances, and may be high or low a few miles per hour. The same is true of the pitot system. When all of these potential inaccuracies are considered, it is obvious that what the airspeed indicates means very little until all these factors are taken into account. The moral of all this is "Never believe an airspeed"—until you have good reason to be assured of its accuracy.

We have found that even the most experienced pilots have a tendency to believe the airspeed implicitly. A pilot will return from a trip in an Apache, on which he had a good tail wind and a high airspeed indicator, and comment on "what a fast Apache this is," when actually it may be no faster than average. Pilots of much more expensive airplanes will automatically assume that an indicator is correct, without even thinking to themselves "I wonder how far off this airspeed is?"

The Civil Air Regulations require that an airspeed system on a model being test flown be accurate within five mph or 3 per cent, whichever is greater. This accuracy is usually not difficult to attain in individual test flight airplanes. Production airplanes may occasionally vary from it, or they may be made to vary on the high side after they leave the factory.

The first Comanches were found by production test pilots to have airspeeds which indicated several miles per hour slow, although the prototype test planes' instruments were accurate. This condition was corrected, and in Comanche production test flights it is ascertained that the airspeed is within the five mph tolerance on the plus side.

The most distressing aspect of the performance exaggeration situation to a manufacturer, is the setting forth by irresponsible producers or would-be producers of dishonest performance specifications on models which are directly comparable to his own products. The competitor may have a model that is so similar to this product that there obviously cannot be a significant performance difference; yet the competitor advertises a 20 mph advantage. This seems to confuse a good many people. The use of a little common sense in looking over the specifications will normally put the two airplanes in proper perspective.

If, for example, two planes appear to be very much alike in general configuration, but the one that has the lower powered engine shows up in the specifications as faster, the chances are good that someone is not being factual. Small, hard-to-notice differences will naturally have a bearing on the comparison, but in general it is not difficult to fit a particular airplane into the right performance category. If there is doubt about the claimed performance, it is wisest to be skeptical and not accept data without fairly concrete proof.

To be certain about performance differences, the best way to compare airplanes is not on paper specifications but in actual side-by-side flight tests. These must be conducted carefully to avoid hazard and to make sure that the conclusions reached are fair, but usually a few minutes of side-by-side flight will determine which airplane is faster or climbs better, and by about how large a margin. Ordinarily, for cruising speed comparisons, full power runs should be made, because there is no question of having used a different percent of power on each plane, and cruising speeds are unusually closely proportional to stops in comparable planes.

Here at our factory we make occasional checks of competitive airplanes, so we know fairly well who is giving out accurate data and who isn't. We have one good simple way of determining comparative speeds on models which are close in performance, such as a 250-hp Comanche and a 250-hp Bonanza, which can be useful anywhere.

With the airplanes in contact by radio, we first fly the two planes at full speed in smooth air side-by-side to find out which is faster. Then the faster one falls back far enough so that when he passes the slower airplane he has had time to get up full speed. As he passes, perhaps 25 or 50 feet to one side, one or both pilots check on stop watches the time required for the full length of the airplane—spinner to tail stinger—to go past a reference point on their own planes. This is done several times at each condition checked to get averages. The airplanes must be held at the same altitudes throughout the passes.

Then the passing time is determined in feet per second, since the length of the airplanes is known, and then converted to miles per hour. Accuracies to within one half mile per hour can be obtained on closely comparable airplanes.

The same check can be conducted at comparable cruising powers if the pilots are sure that they are able to determine exactly what cruising powers they are using and if their power instruments are definitely accurate within reason. A one inch error in manifold pressure, due to an inaccurate instrument or a miscalculation, can make an appreciable error in the results of the comparison. This is why top speed checks are preferable.

Full power, side-by-side take-off and climb tests can also be conducted easily if there is question about the comparison of these performances on competitive models. As in the speed checks, the weights of the two aircraft must be carefully determined. Either the specification gross weights of the airplanes should be used, or equivalent loads in terms of hours of fuel, passengers, and cargo.

It should be stressed that a great deal of caution must be exercised in comparisons of this kind to make sure the aircraft don't get too close. The Civil Air Regulations state that no aircraft shall be operated in proximity to another aircraft in such a way as to create a hazard, but they do permit formation flight if prearranged by the pilots.

Another unfortunate aspect of this situation is the tendency of some hopeful design or production group to publish extremely unrealistic specifications on models that have not yet flown and may not be flown for a long time. This is done with the idea of creating advance publicity, or possibly holding off sales of current competitive models by creating hopes of fantastically better things to come. Often it seems to be done without tongue in cheek—the designers are not experienced enough to know that the performance they claim just cannot be realized. This seems to be true frequently in the case of foreign companies.

The aviation press often unwittingly gives support to those parties who are issuing misleading information. The magazines can hardly do more than publish the figures that come to them in release from the various companies. They are usually not in a position to check the specifications before publishing them. It does seem that the publications could make it clearly understood, without offending the aircraft designer or producer, that the figures are strictly those issued by the designer, with the implication that they may be questionable. This has been done frequently in the past, with state-

(Continued on page 56)

NEXT MONTH IN FLYING

★

GROUNDED AT 60?

An authoritative roundup on the subject of aging airline pilots, a controversy set off when FAA indicated it may order airline pilots to stop flying at the age of 60.

★

NORTHROP INSTITUTE'S SUCCESS STORY

By Gill Robb Wilson

How a small trade school, founded after Pearl Harbor, has become a leading engineering college in space age technology.

★

CHECK PILOT REPORT: BELLANCA 260

One of FLYING's reporters says superior performance of this new fiberglas ship will make it a popular model with pilots.

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with light plane weight and size

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90 Channels – Covers every presently assigned civil aircraft communications frequency. Plus DCS.

10-WATT POWER!... Full power to reach through today's heavy air traffic... ample power to get—and keep—in touch with ground communications... power a-plenty for today and for years to come!

CRYSTAL CONTROLLED RECEIVER... tunes simultaneously with transmitter. High sensitivity to match the range of the transmitter even under adverse conditions.

COMPACT SIZE!... Only 3" high... 6½" wide... 8" deep! Never before 10-watt power in such small space. Designed for easy installation as is or in custom panels.

LOW-WEIGHT / POWER RATIO!... Only 8 pounds complete with power supply... less than 1 lb. per watt output! Thanks to King's advanced electronics methods and components, you get 10-watt reach, meeting Airline requirements, at great economies of weight, space and price—without sacrificing quality or reliability!

CONVENIENCE!... Complete front-panel controls—squelch, side tone, mike gain! Instant, visible, fingertip control!

ECONOMICALLY PRICED!... Top-quality materials and workmanship for notably less than $100 per watt of power!

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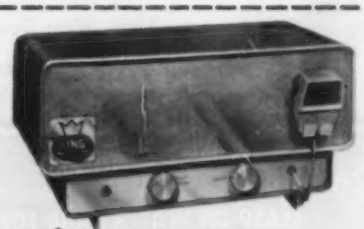

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- Ceramic microphone for long life under constant use.
- Full 10-watt reach.
- Squelch and volume controls on front panel

Advanced electronics brings you the extra reach of 10-watt power in a UNICOM that is a credit in both appearance and performance to any airport office. A limited number are available for use free at special aviation events. Write or call—department UN.

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(Continued from page 54)

ments like, "according to company claims, the cruising speed is—etc."

There will undoubtedly be those among the members of our industry who will feel that it is a mistake to disillusion the public, and to raise questions in the minds of many pilots as to the integrity of various members.

My feeling is, however, that it is time this situation is brought into the open and corrections are started, and that in any event, honesty is always the best policy and will always pay off in the long run. Furthermore, most pilots who have been active in flying for a reasonable length of time are already aware of the kind of misrepresentation being discussed here. This article is mainly a suggestion to those pilots and owners who are not familiar with the situation not to be taken in by exaggerated specifications and indications.

It is also an appeal to those within the industry who know that they have been in a position of misleading the public to correct this situation, in the interests of an improved reputation for integrity for the industry as a whole. Unfortunately, some of these people have, over the course of their business activity, put themselves in such a hole of performance misinformation that they cannot gracefully pull themselves out. They cannot suddenly admit, for example, that next year's models are ten mph slower than last year's were claimed to be. It would take some years to straighten out the situation.

Usually a statement like the one I have made here, complaining about a condition that exists, is not of much value without a suggested remedy. In this case, the remedy could come from within the industry by the various segments taking it upon themselves to put out more reliable information. This is probably too much to expect, at least over a reasonable period of time.

Another solution to part of the problem, at least, would be the establishment of a Standards Committee within the ranks of the aircraft manufacturing concerns, possibly through the Utility Aircraft Council of the Aircraft Industry Association. This committee would have to set up a testing center, and test the various models of member companies. The specifications for the tested models would then be labeled "Approved by the U.A.C. Standards Committee," and this label would be definite assurance of accuracy of specification figures. Perhaps a system of this type can be set up in the future.

In the meantime, there is some feeling at our company that the situation is not one to cause us much concern, for this reason: in spite of the doubt that is raised in many prospects' minds by the misleading specifications of competitors and in spite of the loss or delay of sales, actually the situation is to our advantage, and thinking purely selfishly, perhaps it would be better not to disturb it. We know that in the end, those companies who mislead will be found out, branded as irresponsible and consequently suffer, and those who are honest will establish a reputation as such and come out ahead. END

LET OMNI DO THE WORK

Surprising number of people around don't get the full benefit from the marvelous Omni system, mainly because they haven't learned to trust or rely on it whole-heartedly. They kind of fly with "one foot on the ground"—half by pilotage and half by radio.

Learning to navigate by radio with confidence is something like learning aerobatics. You've got to get on your back several times to know you won't fall out and you've got to fly with just a radio chart—no landmarks—several times to find that radio aids will get you there easier, with less strain and no uncertainty. In fact, you soon find that even a dog-leg to follow the Omni stations is often quicker than trying to cut "cross-lots" by dead reckoning.

Seems to me that the reason why so many people fly Omni half-heartedly is that they haven't fully developed (or don't understand) the technique of using Omni. Their most common error is not paying sufficient or frequent enough attention to the needle. They go through all the motions just right. They tune in the station ahead, center the needle with the Omni bearing selector and then fly on for minutes without ever checking the needle. When they do check, the needle's clear off to one side. So they reset the course selector to center the needle, continue to fly without adjusting their heading and soon the whole thing's repeated. True, even with this sloppy procedure, they usually wind up passing somewhere near the Omni station, but it seems vague and pretty uncertain.

To fly Omni properly, you must remember that there's only one heading which will keep you flying down any given radial. Even then, unless you have an automatic pilot, it would be almost impossible for anyone to fly the precise heading that would keep a needle centered continuously. In practice, you do wander to one side or the other of the radial, which means you should check the needle frequently and make prompt but small heading corrections as indicated. You shouldn't expect to "split" an Omni every time, but with a little practice you instinctively keep close to course and pass pretty much right over the station. You soon realize that Omni is a very simple and very precise means of navigation.

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Regards,

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IN EASY-TO-READ TYPE from Aero Products, St. Charles, Ill., one can obtain a new radio information service. Called the "Aero Radio Guide", this service carries full U. S. coverage of Omni, LF and ADF facilities; all airports with control towers or ILS and includes such general information as Weather Bureau and FAA information services. All information is keyed to WAC or Sectional charts. First year's service with revisions is $19.95; $12.95 renewal per year.

THERE'S A PLACE for everything in this VFR Map case especially designed for the private pilot. Made of top grain Cowhide, in black or ginger, it provides space for computer and plotter; sections for Airman's Guide, Airport Directory, Sectional and WAC charts. It even has a pocket for sun glasses. It may be purchased from Variety Shop Specialties, 6321 Hillcrest Ave., Dallas 5, Tex. for $24.75, postage and tax included. Name in gold is $1 extra.

IN PORTABLE RADIOS, Zenith's improved Navigator, Royal 780, with many refinements over its predecessor is ready for the Christmas gift season. Transistorized, the Navigator brings in standard broadcasts; the 150-400 kc band for European long wave broadcasts, and the FAA L/F weather stations. It is, in addition, a standby navigation instrument of reliability; operates up to 350 hours on six type-C flashlight batteries. From all Zenith dealers, $99.95.

FOR CHRISTMAS

This department is not composed of paid advertising. Items shown are believed to be good values. Companies listed guarantee immediate refund if you are not satisfied.

AS THE PRO FLIES is a good bookshelf item, something for both novice and experienced pilot. By John R. Hoyt, former naval aviator and CAA (FAA) Aviation safety agent, the book is a collection of 24 articles, some of which have appeared in FLYING, covering the elements of take-offs, landings, proper trim in flight, weather hazards, visual flight and the magnetic compass, along with non-technical explanations of instrument flight. McGraw Hill, New York, $4.95.

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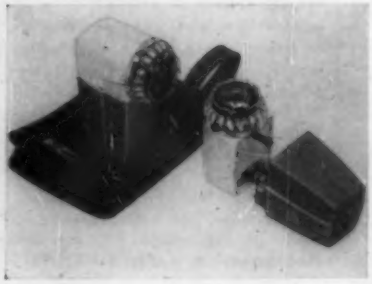

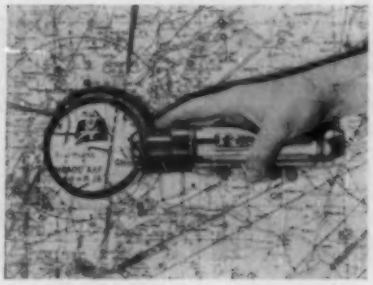

A DUAL-PURPOSE flashlight—one which magnifies as it lights—would ease the job in flight planning or enroute navigation. Designed especially for accurate illuminated examination of charts is this Pike "Chart Reader" a flashlight attached to which is a magnifying glass, also equipped with a red light for night reading. Battery-powered, electric or both; from E. W. Pike & Co., Elizabeth, N. J. Battery-powered $9.50; electric $11.50; converter $4.95.

SOMETHING QUITE UNIQUE in computers is the Radio Navigator. Using color effectively, this computer offers an Automatic Direction Finder (ADF) Director on one side and on the opposite an Omni-Guide, which present pictorially any navigational situation to show the airplane's position relative to ground station, bearing or radial—and exactly what to do to intercept, or track To or From. Tradewind Corp., Box 1377, Amarillo, Tex. $12, with case.

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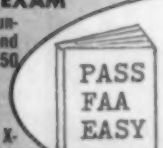

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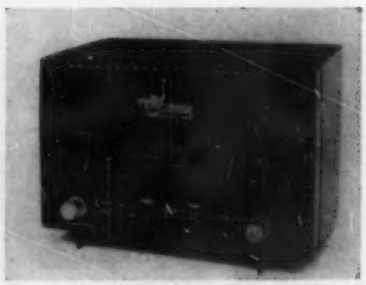

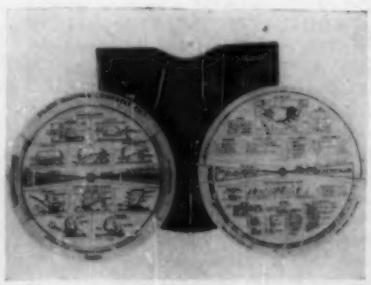

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FOR CHRISTMAS

TOO MANY BOOKS to choose from? A very timely book is Zweng's "Flying the Omnirange." A pilot's guide to VOR and Victor Airways, this book includes the abc's of Omni. In non-technical terms it tells everything one needs to know about omnirange flying from take-off to landing; how to hold a course to or from a station; determine a fix and find your position when lost. $4, Pan American Navigation Service, 12021 Ventura Blvd., No. Hollywood, Calif.

FOR THE ONE who has everything, we suggest the Rol-Ruler, a transparent ruler attached to a roller which does the job of two instruments —triangle and T-square. A time-saver in course plotting Rol-Ruler maintains parallel lines across the chart from course to compass rose without lifting the ruler. A spiral index window in roller automatically measures distances from horizontal lines as close as 1/16 in. Rol-Ruler, Box 164, Riegelsville, Pa. $3.95 pp.

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(Continued from page 18)

SA-16 amphibians as they fly through the stormy sky that blankets a boiling sea below, and the wives and sweethearts of the crews gathered at Base Operations.

Word that one of the amphibians has crashed (no one knows which of the two) builds the scene at the base into near hysteria and suspense.

Aboard the SA-16s events are described with cold realism, dramatic detail and authenticity which Arnold (who lived and flew a year with Air Rescue Service) is well qualified to relate. One amphibian is ripped apart in a landing attempt on the mountainous waves near the faltering lifeboat and sinks immediately with all aboard.

Another attempt is made by the second craft, culminating in a unique series of events and a difficult decision by the aircraft commander. It involves jumping a paramedic into the shark-infested waters and a landing some ten miles away where the sea swells are smaller, taxiing to the lifeboat marked by the paramedic's flares.

The story's crescendo is climaxed by the hair-splitting success and return flight to Ashiya with the near-dead Japanese survivors aboard. Five American lives have been traded for five Japanese lives.

Arnold draws a broad, sweeping picture of the Air Rescue Mission and its activities since WW II. Despite the occasional flamboyant "Hollywood-itis" in the text, the book brings good reading entertainment and carries a meaningful message.

HELICOPTERS AND AUTOGYROS OF THE WORLD, by Paul M. Lambermont and Anthony Pirie, with foreword by Igor I. Sikorsky (Philosophical Library, $10).

An illustrated encyclopedic-reference presenting more than 425 helicopters and autogyros of many nations, outlining their technical details, design, construction specifications and operational performances. Includes discussion on the limitless future possibilities of the rotary wing aircraft in the jet age, based upon its unique operational capabilities.

FOR THE YOUNG ADULT

THE STORY OF THE U.S. AIR FORCE, by Robert D. Loomis (Random House, $1.75)

A new addition to the Landmark Series chronicling the history of the USAF in terms of its proud record, its great heroes and leaders who have pioneered the frontiers of the air and space.

JET PILOT OVERSEAS, by Henry B. Lent (Macmillan, $3)

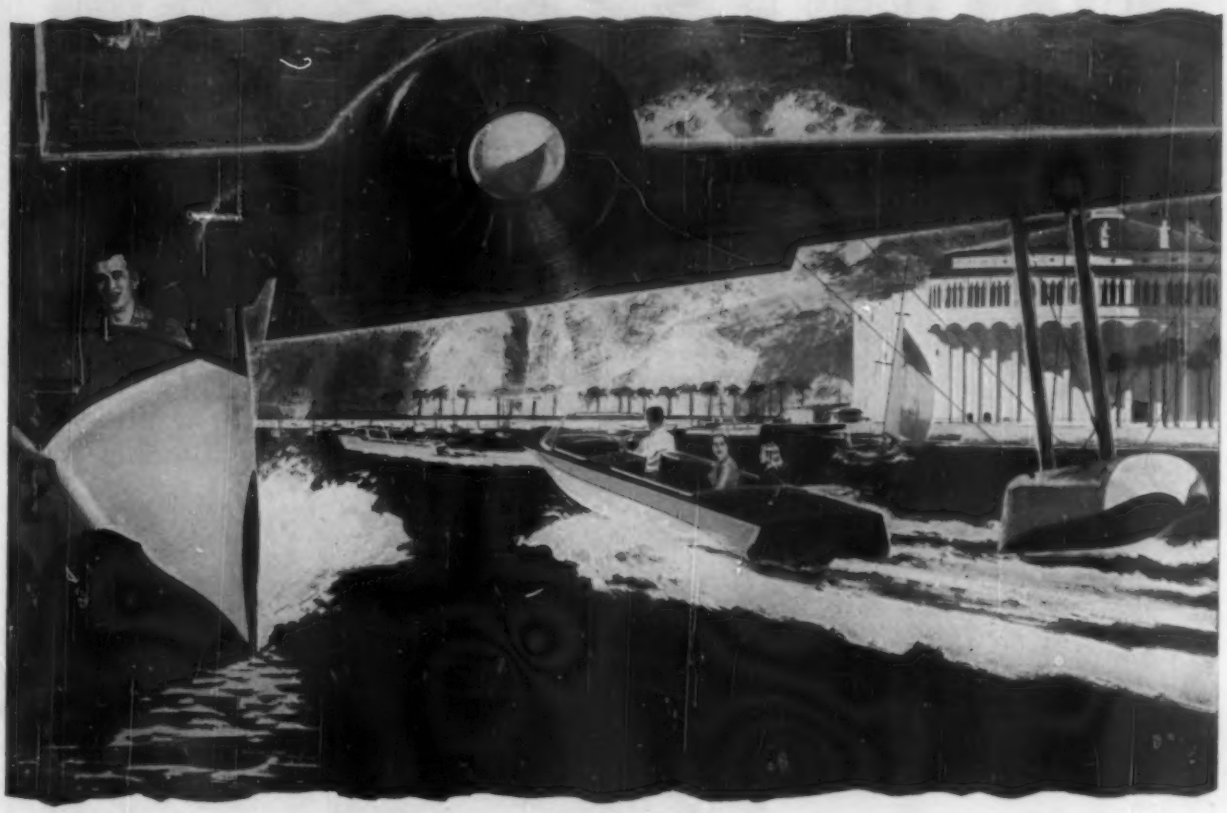
The second in Lent's jet pilot series, this one tells the authentic story of a young AF pilot just out of training and in his first combat assignment overseas.

OUR SPACE AGE JETS, by C. B. Colby (Coward McCann, $2)

Picture story of U. S. military jets.

PLANE FAX

by STANDARD OIL COMPANY OF CALIFORNIA



Traffic is Tough in Avalon Bay

There's a holiday air about Avalon Bay. The motor launches, moored boats and sailing ships make a picturesque sight at this famous Catalina Island resort. But when you're taxiing a big Grumman amphibian here, you take it slow and easy to thread your way through the traffic.

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THE LIGHTPLANE, pictured above, was originally designed and built by Cesar Boreo of Morteros, Argentina as a home construction project. Called Aero Boreo 95, it is now in production by Aero Talleres Boreo of the same city. Capable of carrying three, it has a top speed of 125 mph, cruises at 102 mph and stalls at 26 mph. Powered by a 95-hp Continental, it becomes airborne in 700 feet at full gross load.

Looking just like a full-fledged helicopter, the Bolkow Heli-Trainer is actually a practical flight simulator for training helicopter pilots. Designed in Germany, it will be built here by Hiller Aircraft Corp. of Palo Alto, Calif. Embodying all the characteristics of a helicopter but costing radically less than electronic-simulators, now in use, the captive 'copter is expected to save considerably the cost of pilot training.

Is Alaska Expendable?

(Continued from page 31)

scene rather than improve it. All they want and need are the modern weapons. The aim manpowerwise is to hold housekeeping and service personnel to the absolute minimum.

What would such weapons do?

All 26 bases of the USSR's Siberian peninsula, the closest point of which is less than 60 miles from Alaskan real estate, can be blanketed by these manned and unmanned weapons.

Tacticians illustrate their point by drawing a radius of 1,500 miles, the effective range of IRBM missiles such as the Douglas Thor, with a focal point at Mt. McKinley. The arc encompasses all of the Siberian coast, including the Bering Sea and the easternmost reaches of the Arctic Ocean.

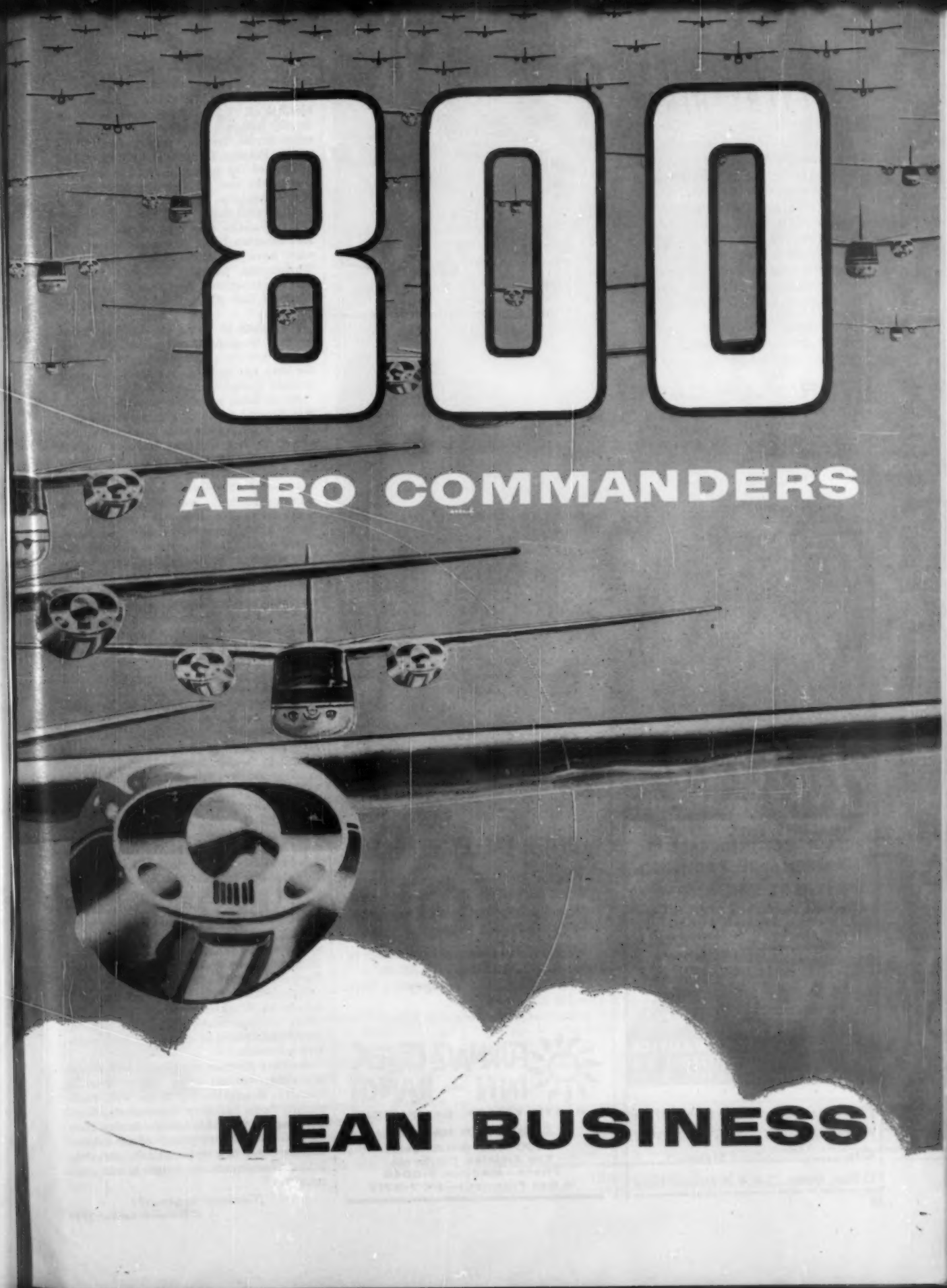
The one-man bombers of the Republic F-105 type can range far and wide around this arc. They can provide combat flexibility and observation capability, both of which are musts for watchdog forces at this sensitive polar position. Utilizing in-flight refueling, the supersonic F-105 has a penetration capability of more than 800 miles—it flew nonstop from Eielson AFB to Eglin AFB, Fla., a distance of 3,850 miles and averaged 700 mph.

Again the military men estimate that the first provocation or hot war action would trigger retaliatory strikes upon all Siberian bases within 20 minutes. They say the firing of U.S.-based missiles and launching of manned nuclear bombers would require three to four hours to reach the targets—much too long to stop second and third wave missile or bomber assaults upon U.S. industrial centers.

Although the Air Force's Armstrong asks only for IRBMs and one-man bombers, others carry his appeal further by calling for Intercontinental Ballistic Missiles (ICBMs) such as the SAC-manned Atlas and the forthcoming USAF Minuteman.

Their thinking is based upon simple, basic measurements of strike distances

(Continued on page 66)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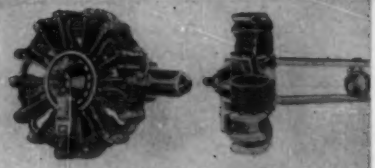

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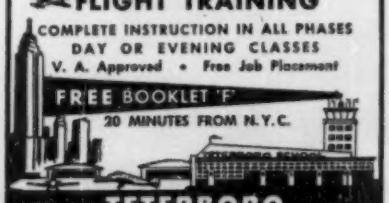

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(Continued from page 64)

from Alaska's top of the world location.

A 5,500-mile ICBM strike umbrella can blanket all of Russia and Asia under its deadly range: Moscow is about 4,200 miles across the polar region from Fairbanks; Peiping, China is about 3,200 miles.

Most of the potential trouble areas of the world can be reached by existing ICBM weapons, if launched from polar state missile pads.

The pundits also remind us that the Red Siberian bases either possess or will soon have the same deadly capability. Washington, Miami, St. Louis, Omaha, San Francisco and Seattle, all fall within range of Red ICBMs and long range jet bombers.

The south-48 states can be dominated by Red weapons if adequate retaliatory threats are not placed in Alaska to make the cost too high for the Reds to risk a straight stateside attack.

All of these proposals provide compelling reasons for a new look at Alaska's place in our family plan for defense. Because, to lose Alaska through neglect would be forfeiting our own birthright to freedom. Failure to give it modern weapons would surely endanger our present investment and would convince our northern neighbors that we "southerners" do in truth consider them expendable. There are other fringe items of a plus nature which proponents submit for evaluation.

First is the matter of Alaska being our own real estate. There are no complications like those encountered by placing missile pads within other countries, such as English bases for the Thor missile.

On this point, it is said, "We can fire the instant free world safety is threatened and the hot line says 'Go!'"

This fact alone is considered by some students on the political scene to be a strong deterrent force to the Reds. Alaska's closeness, its freedom of action, is bound to "water down" Siberian arsenal potency for surprise global action.

What about costs of Alaskan missile bases, compared with great circle route locations?

General Armstrong reports that initial costs would be higher in Alaska than they would in other countries that are receptive to our missile stations. However, maintenance and logistics costs would be lower. This latter advantage puts Alaska in the economy column for the long haul.

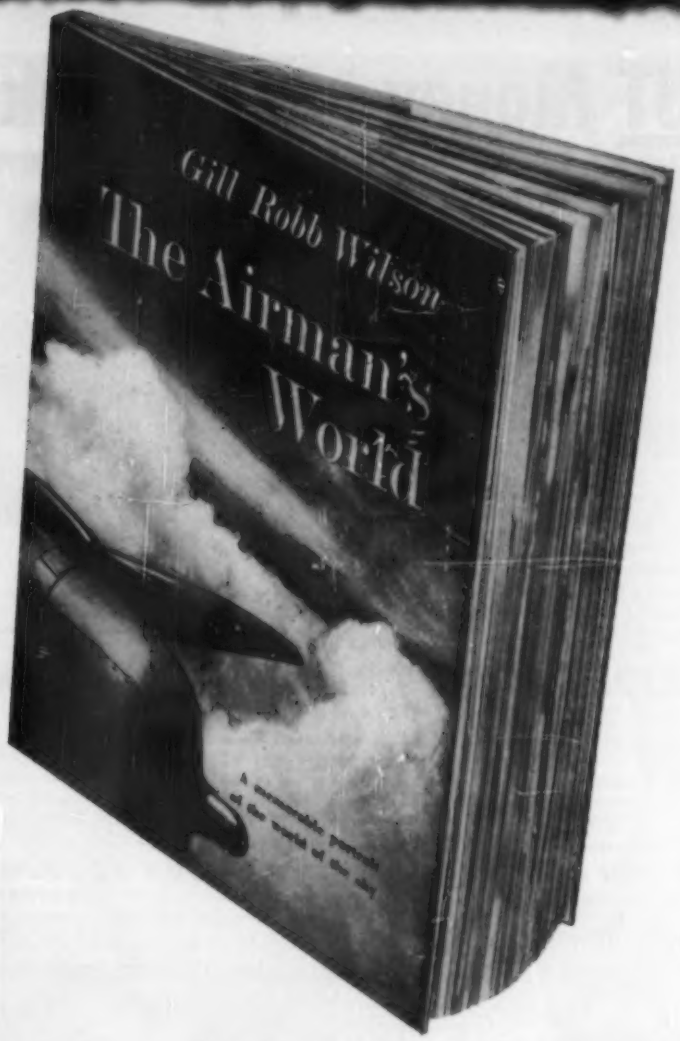
Cash outlay for logistic support is estimated to be one-third that of the Far East launching pads and two-fifths the cost of European installations.

Transportation time is shorter from U.S. depots to Alaskan stations. This would afford shorter missile pipelines and reduced stockpiling of expensive and sensitive materials.

Another Alaskan consideration for missile sites, over any other U.S. or friendly country, is one having to do with community noise and civic discomforts. Alaskans agree with Anchorage leader Hiddleston that "there's plenty of room here. Missile bases can be located in our state without harassment or danger to our communities."

(Continued on page 68)

"...a sense of freedom such as man never dreamed"



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A WORD ABOUT THE AUTHOR

Gill Robb Wilson was a pilot with the French Escadrille 66 in World War I, president of the U. S. Air Force Ass'n, president and organizer of many flying groups...and is now the noted editor and publisher of *Flying* magazine. He learned to fly just after the Wright brothers successfully propelled their flying machine above the ground, and has been one of the leading figures in aviation ever since. In his book, author Wilson conveys the feelings known only by men who are at home in the sky, and explains this exalting sensation to those who have never flown.

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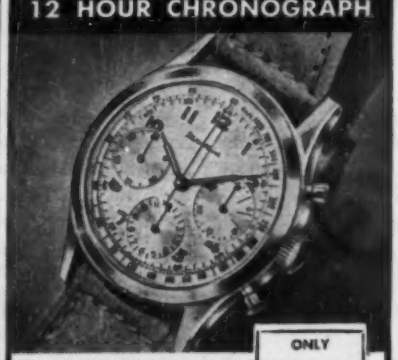

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(Continued from page 66)

Hiddleston backs up his claim with facts: "Our population is so small—243,000 of which one-third is military—and our state is so large (larger than Texas, California and Montana combined) that we'd probably never know they're here."

Hiddleston and his foresighted fellow citizens point to another reason that should bring Alaska higher on the priority list for protection. They claim that trends in jet air travel today forecast Anchorage and Fairbanks as traffic centers for Polar air routes. Already, the commercial airports in Anchorage and Fairbanks are in demand as stopover centers for jet liners from the U.S. to Asia, Europe and eventually via Russia, to India and the Middle East. Air France plans to use Anchorage for its west coast to Europe flights, next spring.

In summary, here are the reasons why military and civilian leaders believe Alaska is our best and most strategic location for well dispersed missile launching pads and manned nuclear bomber bases:

- They will disrupt Soviet capability to stage an offensive attack upon Alaska and the U.S. from northwest Siberia.
- They will complicate the best and most simple strategy of the Reds and force the employment of a more complex attack operation.
- They will reduce retaliatory time against Siberian forces from four hours to 30 minutes.
- They will support the national defense objective by providing faster, better and cheaper defense structures than is now possible with missile launching centers located in countries other than our own.
- Their location there will ease the tensions due to missile launching sites and nuclear aircraft bases being located in heavily populated areas where public and political opposition may be present.
- They will help guarantee the security of Alaska and thus protect the expensive early warning detection and communications network which means so much to the preservation of a pattern for security.
- And with Alaska destined to become the gateway to polar Air Passage—like the Panama and Suez Canals—this crossroads of world air routes needs to be preserved for unrestricted world trade.

It is self-evident again that Alaska is our "Alarm Clock." This new state holds a high place in our future.

A long line of military leaders, men with such names as Arnold and Mitchell, have by their statements supported the views of General Armstrong and others, long before this world envisioned intercontinental ballistics missiles and nuclear weapons.

In fact, in 1935, when General Billy Mitchell was fighting the cause for global air power as the key to world peace, he said, "Whoever holds Alaska, holds the world."

Alaska is a natural bastion for freedom at the top of the world. Whether this land of the midnight sun harbors friendly arms for peace or unfriendly arms of the invader is a matter for us to decide.

Is Alaska expendable? END

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Another Canadian aircraft in the news is the Canadair 44, turboprop cargo transport, shown below, largest airplane ever built in Canada. Shown here is the side loading version, 12 of which will go to RCAF. Fifteen, on order by two U. S. cargo carriers, will have swing tail, rear loading.

Transition to Turbines

(Continued from page 43)

Rolls-Royce reports that Dart overhauls are being carried out by Capital Airlines in Washington, D. C., and by Continental Airlines in Denver, Col. These centers are wholly engaged in overhaul of scheduled airline engines but, in some cases, they will provide limited service to B-Plane owners. In fact, Capital has a complete Viscount operating and maintenance leasing agreement with United States Steel at Pittsburgh, Pa.

In addition, Rolls has signed agreements with Pacific Airmotive Corporation at Burbank, Calif., and Airwork Corporation at Millville, N. J., for establishment of overhaul and maintenance shops at these two regional locations. This action is welcomed by non-scheduled operators and places experienced support facilities "next door" to operations hangars.

Other licensed and independent overhaul bases are in the process of study and negotiation. When the market requires it, Rolls plans one for Miami, Fla., to serve the southeast area, and another for the Midwest.

In addition to the U. S. located facilities, Rolls-Royce's own Montreal shop and that of Trans-Canada Airlines, at Winnipeg, help broaden the engine support base. Rolls is also building its own repair and overhaul base at Sao Paulo, Brazil, to serve the South American Dart users. Rolls guarantees spare parts delivery within 30 days from receipt of order. This applies to all engine parts and accessories of its manufacture, as well as to certain vendor items.

David Boyd, director of manufacturing at Rolls' Montreal plant, pinpoints his company's policy as being non-competitive with approved engine overhaul and servicing organizations. Since these companies "help extend our front door service to Rolls engine users," he says, "our aim is to cover expenses only, to help them broaden new engine sales through better service."

The Montreal plant, a highly flexible facility, is currently doing overhaul on the Dart 6 and 7 and Westinghouse J-34. One of the three assembly lines will be converted to the new 6,000-hp class Tyne, turboprop engine that will power military and commercial versions of Canadair's CL-44 transport.

(Continued on page 72)

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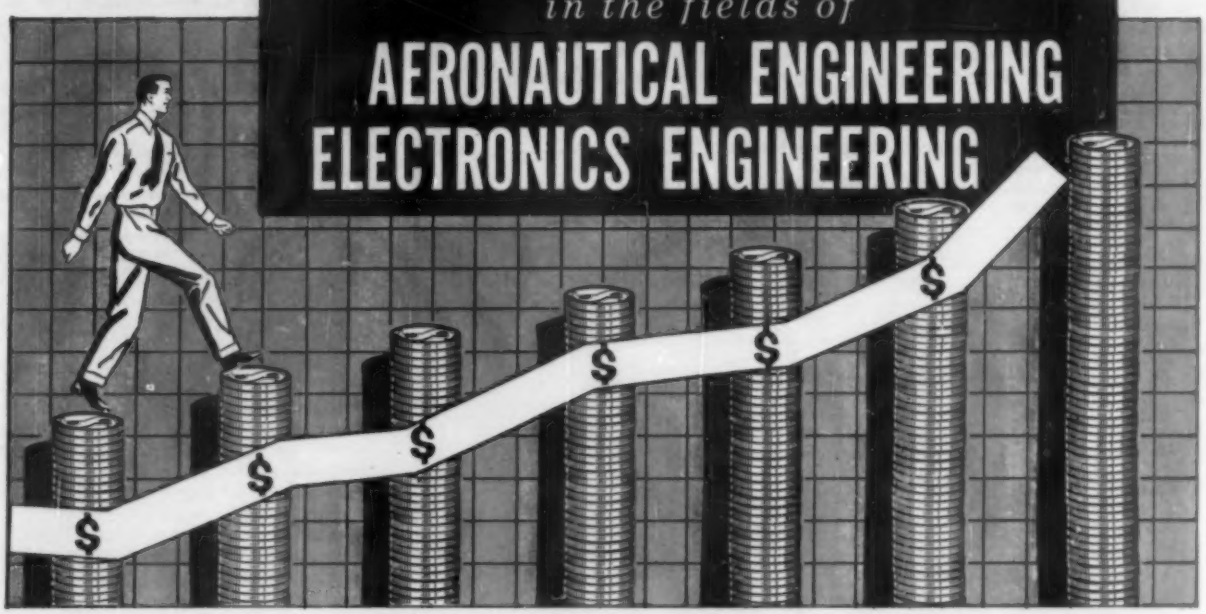

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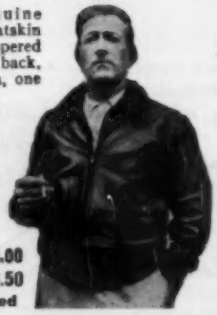

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(Continued from page 70)

At present there are about 750 Darts in service in North America, many of them with Viscount-equipped airlines such as Capital, Northeast and Continental in the U. S. and Trans-Canada in the Dominion. These carriers have accumulated 50 per cent of the ten-million hours of Dart operating time to date.

Now, however, local service carriers and business transport operating experience is mounting daily. The increasing number of Dart-powered transports will have a marked effect upon 1960 figures.

More than 70 Dart-powered twin-engined planes by Fairchild and Grumman will be operating by the end of this year. The majority are performing high daily utilization for local service carriers, of which ten are located in North America. The remainder are business operated planes where the day to day flying rate is not as high.

At the moment, Rolls-Royce believes its own shop, the existing trunk airline facilities and those of Pacific Airmotive Corporation and Airwork are sufficient to handle the overhaul traffic and to render adequate service. As the requirement increases, licensed shops will be designated in Miami and the southwest.

Rolls-Royce management says its single most important function at this time is to concentrate on proper training of air crews and ground maintenance and servicing personnel. This it has done since the beginning of the program, and more than 1,000 "students" have been processed through its school at Montreal.

The convenience factor will be available for U. S. corporate and business operators as soon as PAC and Airwork have completed their engine spare parts inventory. They will also carry spare engines to reduce en route shipping time to operators. PAC and Airwork hope that their investment of thousands of dollars in Dart tools and equipment will bring business from local service airline operators using Dart engines.

To date, neither PAC nor Airwork has completed installation of tools and equipment. Both intend to be operational soon after the first of the year, long before Dart engines with corporate operators begin to approach the upper limit of the first between-overhaul period.

Pacific Airmotive Corporation has one of the most complete independent engine, propeller and airframe maintenance facilities in the country. It is an approved engine maintenance and repair shop for Pratt and Whitney piston and gas turbine engines.

About $250,000 is being invested in turboprop tools and equipment, to facilitate Dart overhaul at the rate of one per day.

PAC's engine division has been overhauling Pratt and Whitney J-57, JT3 and JT4 engines at the rate of one a week and will soon shift to one a day. The first JT-3 for a Continental Airlines 707 was processed during August and the flow of these engines has accelerated since PAC also serves as the reciprocal and gas turbine overhaul and maintenance center for West Coast manufacturers such as Douglas, Lockheed and Boeing.

(Continued on page 74)

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(Continued from page 72)

It has contracted with Standard Oil Company of California for overhaul of its Viscount Dart engines.

Pacific Airmotive points to its comprehensive airframe and transport services as the natural back-up to its engine overhaul work.

The company is sales and service distributor for the Grumman Gulfstream and by early fall had sold 11 of these Dart-powered planes to business users. It has already completed interiors and other special modification work for owners of Fairchild F-27 aircraft. It is a prime modification center for conversion of Convairs to turboprop power. The latter includes an agreement with Allison Division of General Motors to perform all of its Convair 340-440 conversion to Allison power.

Another step in the development of this overall corporate plane service and maintenance capability was announced by PAC recently when it purchased the Cochran Aviation facilities and services located at Oakland, Calif., municipal airport. This was done to complete the full range of services to business operators of all types of planes. The Cochran purchase included West Coast sales rights to the Beech line of aircraft.

Airwork Corporation is a relative newcomer to the engine overhaul business. It has gained wide acceptance for workmanship since setting up shop in 1946 at Millville, New Jersey's war surplus airport. It has processed more than 8,000 engines through overhaul including all varieties of powerplants ranging from Pratt and Whitney, Wright, Continental and Jacobs radials to Continental and Lycoming lines of horizontally opposed engines.

The Millville facility, employing 350 and comprising about 50,000 square feet of modern well equipped work area, is devoted exclusively to engine and engine accessory overhaul operations. It also has a reciprocal and T-prop accessory overhaul plant at Miami which specializes in Allison 501-D 13 T-Prop control systems. Other sales and service offices are located at Washington, D. C., Newark, N. J., Cleveland, Atlanta and Miami.

Tom Dickson, Airwork's vice president for operations, estimates that the company will invest more than $500,000 in additional equipment and will construct 15,000 square feet of new work area. New equipment list includes full scale turboprop test stands, accessory test rigs, balancing equipment and new machines. The company plans to hold its turbine engine capability to powerplants of the 10,000 ehp class or less. In turboprops, its plans include the 5,000-6,000 ehp RR Tyne, the miniature Pratt and Whitney PT-6 and also the P&W JT-12 small pure jet.

Airwork will be ready for Dart engine overhaul by early summer of 1960. Its aim is to funnel all engine work through one of its 23 Class-A dealers in the U. S., many of whom are fully qualified to perform complete engine change and airframe repair and overhaul services.

Dickson stressed that Airwork will handle engines only. Rotol propellers will be serviced and overhauled on the east coast at General Electric Company's North Ber-

(Continued on page 76)

A QUICK START IN AVIATION

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In this 16-month course, an Embry-Riddle student learns aerodynamics, the properties and strength of materials used in aircraft, engines and their components, and numerous other subjects. He acquires the knowledge and skills necessary to take apart, repair and reassemble an airplane. It's a direct step from classroom to payrolls.

Airframe and Powerplant Technicians are employed wherever aircraft are built and flown. Employment with commercial airlines offers opportunities for advancement to positions such as Flight Engineers. Many will operate the maintenance

facilities for local airports, or their own maintenance service for private and business owned aircraft.

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- ☐ Airframe & Powerplant Technician
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- ☐ Aeronautical Draftsman
- ☐ A & P Combined with Commercial Pilot
- ☐ Business Pilot (with University of Miami)
- ☐ Executive Pilot
- ☐ Commercial Pilot
- ☐ Instrument Pilot

(Continued from page 74)

gen, N. J., plant.

Best estimates for cost of Rolls-Royce Dart engine overhaul are about $6,000 for labor and $2,000 to $4,000 for parts, depending upon age of engine. For contrast, but not for comparison, a DC-3 1820 overhaul is approximately $5,500.

Since the Allison Division of General Motors is the only other maker of turboprop engines now operational in commercial planes of North America, its plan for overhaul and spare parts service is geared to airline requirements at this time. Nevertheless, its unique unit engine exchange plan has aroused interest among corporate customers. Allison plans to offer the same formula to owners of converted Convair 340-440 Allison powered planes.

Under the terms of the program, Allison maintains complete inventories of engines, propellers, spares, components and power-packs for its five airline operators —American, Braniff, National, Pacific Southwest and Western Airlines.

As an airline nears maximum allowable operating time for the engine or its Aeroproducts propeller—another GM product —it notifies Allison and a replacement or complete "Q.E.C." (quick-engine-change) power-pack is shipped. The exchanged unit is returned to the engine plant and processed for overhaul. Charges are then tabulated to an agreed formula and submitted to the airline. The overhauled unit is returned to Allison's exchange pool until required by a participating airline.

Also covered under the unit exchange program are a variety of major components, including the reduction gear assembly, turbine section, fuel control system, phase detector as well as alternators, starters, combustors and cabin superchargers.

This program reduces an airline's spare engine inventory requirements by as much as 50 per cent and represents a healthy reduction in dollar investment. It eliminates the need for establishment of its own extensive engine repair facilities.

The relative merits of this "package" system compared with that of airline engine overhaul shops and licensed stations —of the Rolls-Royce pattern—have been debated by business plane owner groups for some time. Various modifications of the engine pooling method have been proposed but so far no firm agreements have been reported by corporate owners.

Without question, operational history of turboprop engines has been excellent. Their performance over that of piston engines for the same comparable period has been fantastic and American operators already feel very confident that the long haul capability of the newer, more efficient and reliable source of power will even outdo its own high performance standards.

To this, Jim Hall, RR service manager, says, "We are being very cautious in relaxing performance reins on our engines because we believe that this policy will ultimately pay heavy economic dividends for the users. In fact, the turbine engine —including the turboprop—has already advanced its life stages faster than that ever attained by the piston engine."

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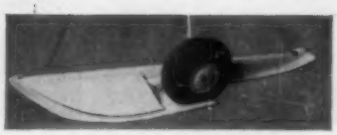

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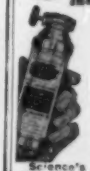

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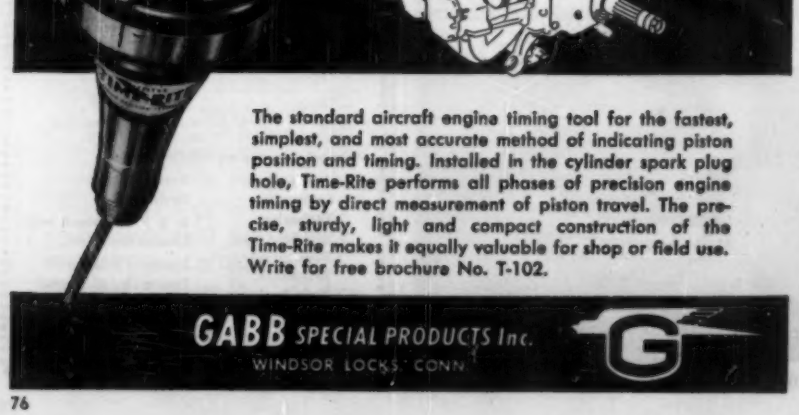

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2,300 hours between overhaul for their Darts and Hall believes that the period will grow to or beyond 3,000 hours in the not too distant future for many operators.

Rolls-Royce management feels, since it has more or less pioneered turboprop power in this country, that many of the problems faced by it, and the operators of Dart powered equipment, have made and will continue to make the road easier and less costly for those who follow.

There seems to be no dearth in growth plans for obtaining the maximum in reliable, safe, long life performance out of the turboprop engines. The potential is high and the only factor limiting the full development of North American overhaul and servicing facilities is the growth in numbers of such aircraft.

Powerplant leaders are convinced that continued demonstrated economies and efficiency of T-prop planes during the next two years will accelerate growth in ownership, and thus break down any current reluctance to buy caused by the wide initial cost span between present hand-me-down piston-engined equipment and the new turbine powered craft.

The year 1960 should provide positive evidence in support of these trends and point the course for future growth. END

I Learned About Flying

(Continued from page 48)

half blocked. The CAA operator asked if I had the ground in sight at any time and what landmarks were visible.

On the third try, I got a good cone aurally, and visually on the marker beacon, and was then down to about 3,000 feet. A road, highway and river passed in rapid succession beneath me, yet I was over the Philipsburg runways before I was sure of my exact location. Part way down the south runway, I made a one needle-width turn to the left and lost visual contact at the 180-degree portion of the turn so bad was the driving snow, yet the runway came in sight again after making due allowance for the west wind.

There was no way of telling what the ice had done to affect the lift on the wings. There certainly wasn't enough ice as far as weight was concerned to do much harm, as I was alone and the airplane well under maximum gross weight. The CAA operator estimated the snow at about four inches depth, so I decided on an over-the-fence speed of 100 mph with the throttle ready if any stall shudders developed. The landing was normal and there was runway to spare.

As I parked the Swift, I realized what had been taking place in the previous 20 minutes. Here had been the same basic conditions present many years before. I had no co-pilot and the simple instrument conditions of that earlier flight had been compounded by icing troubles.

Of one thing I was sure—the ghost of that horrible, uncontrollable first instrument flight had been once and for all laid to rest. There was no other way that it could have been accomplished.

Instrument flight would be much easier to contemplate from here on in. END

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D18S—Excellent interior, painted exterior, dual instruments, eyebrows, hydromatics, de-icers, oleo drag legs, omni, VHF, ADF, ILS, LF, etc. Special.**$19,800**

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Those Live Wires at Reading

(Continued from page 35)

and to serve industrial users who may grow large enough to buy or lease their own planes. He feels that some sales can already be attributed to this operation.

Originality in sales and management relations with the industry as a whole has sparked RAS's rise to national prominence. Of the many things which Sime and his tightly knit team have done, the annual Reading Maintenance and Operations Meeting, has contributed most to RAS's gain in national stature.

This unique program had its beginning with the realization that aviation was growing up and one prime need in this natural expansion was to spread communications and know-how among the user servicing operations as rapidly as possible. Each year attendance broadens as topics and problems of close interest to pilots, fixed base operators, control agencies and manufacturers are dissected and digested for the benefit of knowledge-hungry commercial airmen.

Last year nearly a thousand passengers landed at Reading in more than 300 airplanes, during the June 5-6 meeting to wrestle with topics such as weather forecasting, accident prevention, requirements for radio maintenance and repair, air space use, new techniques for training and flying multi-engined aircraft, etc.

Of growing importance and significance are the awards for excellence in business plane management, operations and equipment. The "Flagship of the Business Fleet" contest is a cherished trophy because it represents all-round proficiency in operations and maintenance.

Principal inducement to new business and the holding of old customers is high quality workmanship for a fair price. This is the basic secret of RAS's growth and must be cultivated and developed before any company can prosper and grow in a competitive business—it's even more of a business getting factor in fixed base operations, where every customer is an individual requiring personal attention and honest counsel in the purchase of high unit cost equipment. Close after-sale relationship is a magic must, Bertolet emphasizes.

The constant drive for new business to keep the shop operating has produced military modification contracts which have broadened the company's big plane servicing capability as an important fringe benefit.

What about the future?

Here in brief are Bertolet's hard-hitting observations as to the health of his company and forces which are bound to direct the course of the industry for better or for worse:

"This year RAS has rung up about $2 million in plane sales. This has meant nine Aero Commanders at about $150,000 each and ten single and twin-engine Pipers. Other planes included used aircraft and, as you probably know, we almost always have to sell three used planes to every new one.

"With Cessna producing about $59 million in new planes annually and Piper totaling $70 million, I believe the fact that our industry is selling about 6,000 commercial airplanes a year is undeniable evidence of a substantial potential.

"So, when I evaluate the sales we have not made, on an industry-wide basis, I don't think we have begun to sell as yet. Our sales for 1959 should have been well over $4 million and, if we do the job we plan to do, 1960 sales should double.

"We must rid ourselves of the miracle of flight, the glamour of being a pilot, and get down to basic hard-sell techniques. We must stop selling to ourselves. We must get across the stream into industry board rooms.

"Not long ago, we needed to buy an electronic computer. International Business Machine representatives asked for an opportunity to demonstrate a machine which sold for about $5,000. When they arrived, there wasn't one salesman but there were four sales engineers. They put on a presentation to our management

"You should have seen it before modifications . . ."

group that clinched the purchase. They knew what their machine would do but, more than that, they knew what that computer would do for our business.

"Here we are, selling products ranging from $150,000 to $5,000 and what do we do? One man must pound a beat as best he can without benefit of applications studies. Even more of an obstacle, he doesn't have the planning and programming essential to get him and us to the board room to plead our case for the logic of planes in any business.

"RAS, and I believe other operators and some manufacturers, never will develop the full market potential that's there for the taking unless we do place sales management and market development functions on a more practical, business-like basis.

"Next year we are revamping our whole sales structure. Management, in addition to sales personnel, will receive training in the basics of merchandising. Our sales staff will be augmented with men who have completed pre-employment interviews at a nearby college. We must have salesmen as well as pilots.

"In addition to sound sales procedures designed to penetrate the market, sales incentive programs which provide proper rewards for the enterprising, producing salesman will be applied.

"There is one more cardinal point I want to make: We've never learned the value of a profit. We give away our shirts in this industry and thus strangle our chances of building up working capital for sound business expansion.

"RAS plans to develop a strong group of regional or area dealers for sales, maintenance and overhaul business growth. But we know one of the most frustrating problems will be to get dealers to honor and work to a standard fair profit-making system. The local operator who passes on his own deserved profit or commission to the customer, cripples all operators and spoils his own chances of making a fair living. This one fact of life is something all of us in the industry must attack and rectify or otherwise we'll face complete saturation of the present limited aviation user market.

"The final growth factor which seems so important to me has to do with the men on the line—the shop employees, accountants, clerks and just plain greeters. We must remember that the customer pays our salary and that he buys what he wants for reasons which are of great importance to him. A chance remark in the shop, overheard by a customer, one which may imply the customer's lack of knowledge in buying some piece of aviation equipment, can lose a good friend forever. This problem is another we hope to tackle through in-plant training for everyone.

"That's about it! We've made wonderful progress but we're not going to keep it unless we do some intensive boot-strap lifting of our own. We need this broad brush feel to keep from losing ourselves in the forest of specialization. Certainly few businesses have to cover the middle ground or areas as do the fixed base operators—and we must do all of these things before we can honestly say to ourselves that the field is covered." END

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America's Main Street Air Line

(Continued from page 27)

offer *air travel!*

Yet, with all of this confidence and growth manifested by statistics, there has been a steady public resistance to the "local way." The reason is simple and obvious. Trunk line service and comfort made rapid strides. Many travelers sought other means until the locals could modernize. Passengers wanted the physical comfort and benefits that came with pressurized cabins, for example. The new carriers' managements wanted them too.

Try as they did, early local service managements hunted high and low for American or European aircraft manufacturers who would build them the plane they needed—they knew the day was not far off when hand-me-down wartime equipment would be unacceptable.

First of all, the little lines had no money—they had barely been in business a couple of years and some were seeking new or better equipment long before they had their final certification.

Nevertheless, Boeing and the Fokker Company in the Netherlands, traded intelligence gained from a series of studies designed to spell out local requirements. Boeing decided to concentrate its efforts on the giant jet 707 liners, so Fokker joined hands with the U. S. troop carrier plane building company, Fairchild Engine and Airplane Corporation. After much study, research and preliminary engineering evaluations, the two companies worked out an agreement. At long last, the locals were due to have their first modern transport.

Now the next problem was to find the money. This has proved to be much more difficult than anyone believed during those earlier years.

They were to find that DC-3 values—then in the $150,000 to $300,000 brackets, were to plummet to the bottom before their new planes were ready for delivery.

West Coast was the first of the locals to contract for the purchase of F-27. Its president, Nick Bez, announced he would not require government assistance, and signed a contract for six planes. The first was delivered in June, 1958. The following September, his fleet of F-27s ushered in the turbine age of air transportation for the "little" lines. Following suit were Piedmont, Bonanza, Pacific and Ozark Airlines; Aloha in Hawaii, and Northern Consolidated and Wein Alaska in the 49th State. Government-endorsed financing was employed.

Initial passenger reaction to these new planes proved one all-important point—local passenger traffic grows in proportion to the class of service rendered. Since this was first class service, the reaction was better than expected for the early period.

West Coast showed steady increases in passengers carried month by month over routes which were formerly the domain of DC-3s. The first six-month increase was 44 per cent. En route times were cut as much as 40 per cent, even though route patterns themselves were not yet altered to suit carrier management desires for longer, skip-stop authority for F-27 flights.

Piedmont, Wien Alaska, Bonanza, Northern Consolidated, Aloha and Pacific Airlines are likewise showing market increases in load factors. The two southwestern U. S. local carriers are establishing load factors which are higher than anyone—including the most optimistic of company salesmen—ever expected. Bonanza reports 64 per cent to 67 per cent load factors and Pacific Airlines' performance is in the same ball park. The latter's planes have 44 seats for high density commuter service.

Canadair has the 540 Convair type, turbine propeller transport heavily committed to route evaluation operations with Allegheny Airlines. It is being used for fast, nonstop runs from Pittsburgh to Washington and from Washington to Eastern Shore resort terminals. Allegheny plans to place several more Convairs converted to turboprop power into operation during the early part of 1960.

Why is conversion so slow? If all the news is so favorable, and it's self-evident that local passengers will support new equipment, why is conversion to new planes so slow?

One bald fact is that the carriers need money.

In your personal affairs, you can't buy more than your credit is worth. The same is true of the carriers.

Locals have a very low profit history due partly to their youth, partly to inefficient equipment, and partly because of the public service nature of their operations. They have relatively little or no cash in the bank, except for working capital. Yet, banks are reluctant to lend money to companies which do not have a firm profit-making history or potential, and do not possess ample equity to back up loans.

The Congress and the Civil Aeronautics Board have taken steps to help correct the financial roadblock by granting guarantied loans up to 90 per cent of $5 million for new planes and support equipment and facilities. The remainder must be financed privately by the airline.

The average value of a well-used DC-3 today—in good condition—will range between $40,000 and $70,000. By 1961, some experts predict they will be priced as scrap. To rate the top price, the plane must be in unusually fine mechanical condition, with low flight time on the plane and engines. In contrast, the F-27 turboprop—less the customer's desired extras—costs $635,000 to $750,000 plus. The Canadair 540 is reportedly priced at $1.4 million and up.

So it's easy to see that an airline with ten DC-3s may find it difficult to realize $700,000 from the sale of existing equipment. That amount will buy but one 40-passenger F-27 turboprop sans spares, special radar-radio systems or vitally needed ground support equipment for jet fuel storage and handling.

It can be assumed that a modern turboprop, with its 40 to 48 seat passenger capacity, can do the work of more than one DC-3. Some experts estimate the minimum equivalent is 1½. Therefore, complete replacement would run from $60 to 80 million upwards.

Obviously, the $5 million loan limit is

(Continued on page 82)

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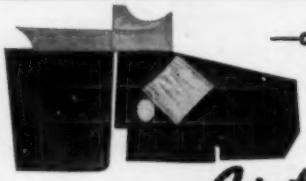

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(Continued from page 81)

far from adequate for efficient, economical systemwide replacement of the old plane fleets. The amount must be higher, and efforts are now under way to obtain congressional approval for raising the guaranteed loan limit to $15 million.

Broadening the base of stock holdings is another method of raising needed re-equipment funds. However, some locals are resisting this stubbornly because it means dilution of closely held stock. New issues will tend to break "family" control of the companies. Incumbent managements know that it will create a host of new organizational problems. Nevertheless, qualified observers are sure this will come to pass if the lines are to grow.

They have taken the basic steps towards this goal by combining forces under the Association of Local Transport Airlines (ALTA) and the Air Transport Association (ATA). But, according to ALTA president Gwinn Hicks, "We haven't scratched the surface yet!"

The lines do have the friendly aid and assistance of manufacturers, suppliers and others who are interested in their future.

Why can't locals make money? This is the champion stickler of the year. Some do show a small profit, most lines do not. In addition to the reasons already discussed, here are some pertinent facts behind the question.

Under their charter, locals are required to serve low traffic producing communities because it is deemed in the public interest by the government bodies who establish the routes and designate the mail stops. These low revenue producing stops qualify the carrier for government subsidy to cover their losses in serving Main Streets. At the end of specific frequent periods, each carrier has to make a full report on his operations and costs for the period and apply for the earned subsidy. This and mail pay inevitably lead to fluctuations due to changing policy and other unpredictable frustrations. Sometimes, as was the case this year, government checks are held up due to controversial action. Managements have to borrow needed capital from banks in order to meet the payrolls—the short term loans are subject to sizable interest too.

In truth, the industry feels subsidy payments to the local airlines are payments to the public—to the communities and in effect to the passenger himself. No carrier has received subsidy to permit profits for division among the stockholders. CAB monitors carrier finances to make sure that these funds are retained for operation expenses. Meager profits earned over and above subsidy are usually ploughed back for operations use.

How do local managements view themselves? By and large, local service carrier managements feel that they have just begun to come of age. The last ten years have been a matter of shaping their organizations and defining the mission.

Now, carrier leaders believe they must establish stronger, more effective executive and administrative programs. They must analyze the potential and set long range plans for achieving them.

They must work together more closely as a business group and thus help govern-

ment and trunkline partners progress faster through cooperative efforts.

They must insist upon and receive a more realistic, uniformly fair treatment from the multitude of controlling agencies and bodies.

Above all, they want to be free to do business the American way by delivering a healthy amount of self-help.

Some believe that CAB and FAA can eliminate some of the excess work and give the locals a better opportunity to make a profit through wise management, if subsidy and mail rates are stabilized for long haul planning. Year to year guessing to a new set of rules is costly.

National defense is often a dull topic these days, but it's well to keep in mind the importance of the local service carrier organization to you. Its fleet of planes and its capabilities, should an emergency arise, are a natural backup for the military air logistics force. This insurance duty alone calls for some serious support of their new equipment requirements.

What do the passengers want? The last is most imortant:

- Modern, pressurized transport rates the top spot on their list.
- Next they want more frequent schedules for better commuting.
- Express service between key market centers of the system.
- More reliability of schedules in bad weather is an influencing factor.
- Better information for passengers when delays are unavoidable.
- More uniformity of service and charges by airline supporting services such as taxis, hotels, etc.

During surveys of passenger attitudes aboard local service airlines, one of the strongest air travel trends developing among commuting business men is the swing to air commuting via locals because auto transportation, especially for one person, over distances of 100 or more miles in flat area has become too costly.

The passengers attribute more frequent schedules and better equipment as important plus factors for using the airlines. The high cost of auto fuel, meals and hotels for overnight stands make air commuting cheaper and safer.

It is self evident that "your" airline, the one that stops at your town, is something more than a metal bird to take you flying. It has been given an important role to play in your future. How it plays it will, in a large measure, depend upon the understanding support it receives from you and your fellow passengers, from your community, whether it gets the financial support from the banks and the government, and whether it is allowed to grow and mature so that strong purposeful management can earn a profit and thus insure the nation's long range, already quite sizable investment.

Your "little" line and the other 19 hold a sizeable chunk of responsibility. They must generate the new air traffic needed to fill the 100-passenger giant jetliners flying the mainline routes. They hold the key to the success of the jet age and owe you the opportunity to fly first-class all the way from your Main Street to any other part of the world. END

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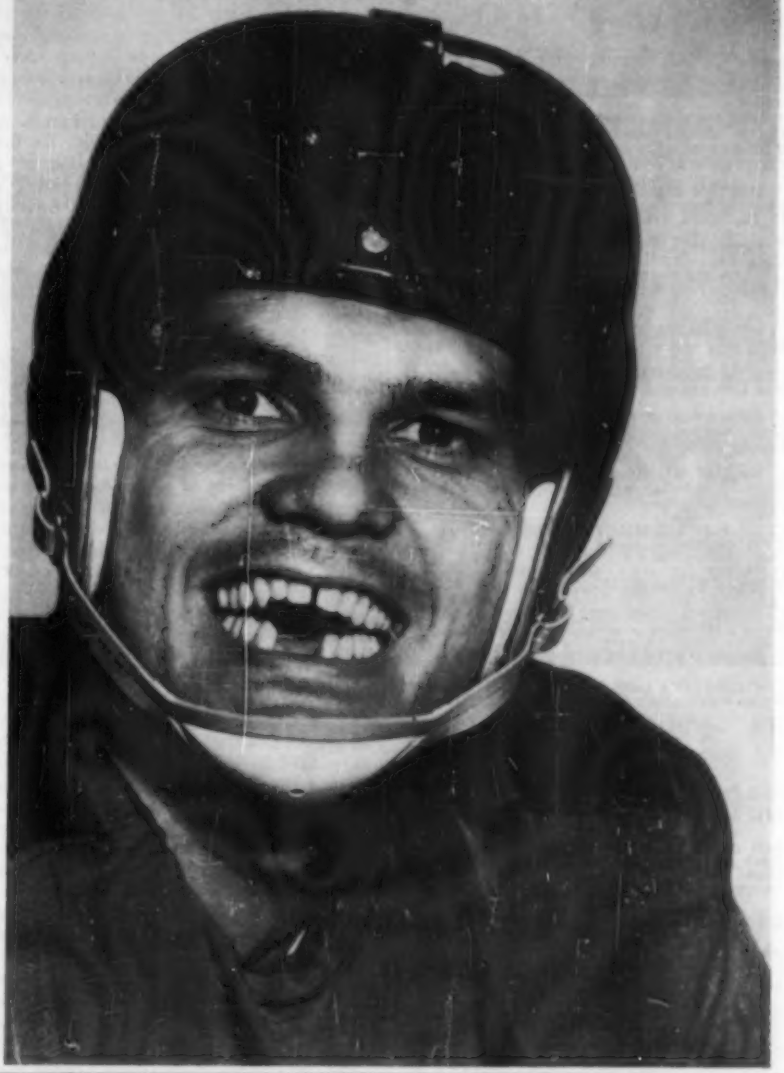

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Cruise Control Techniques

(Continued from page 44)

wing will assume in flight. For instance, with a Cessna 182 at a specified weight, the angle of attack of the wing will be decreased as the pilot advances the throttle and increases airspeed. How do we know this? Because the pilot must apply forward pressure on the control wheel (this results in a change of the angle of attack) as he applies more power, otherwise the airplane will climb rather than hold its cruising altitude. This also works vice versa, i.e. less power, more angle of attack needed to sustain flight. In the case of the same airplane flying at a given airspeed, the wing will need a greater angle of attack when heavily loaded than when lightly loaded.

How can you find the L/D point of the airplane which you fly? Well you can get out the blueprints of the airplane and work the slide-rule. But if you will settle for a fairly accurate way, look to the *indicated* airspeed for the clue. The indicated airspeed which is related to the maximum L/D of the wing generally is about one and one-half times the *indicated* stalling speed.

Applying this general rule to the Cessna 182, which stalls at 55 mph with flaps extended, the indicated airspeed for good L/D performance is 55 x 1.5 or 82.5 mph. Hence, when on the landing approach and you desire maximum safety by using the gliding ability of the airplane rather than depending upon engine power to make the field, the indicated airspeed for the Cessna 182 should be held close to the 82.5 mph figure.

When at cruise and you wish to make the most economical descent from the standpoint of fuel, look to the L/D indicated airspeed. Again referring to the Cessna 182—it stalls at 62 mph with flaps up, so 62 x 1.5 equals 103 mph. The pilot throttles back to minimum power after carburetor heat has been pulled on, rolls in some trim to maintain a glide near the 103 mph mark, and enjoys a descent literally on the "wings of flight."

The point to remember here when practicing such a descent is to maintain enough engine power to prevent the engine from over-cooling. Also some engines need periodic clearing (short period of acceleration) to prevent spark plug fouling.

Incidentally, the flaps-up L/D speed also can be used to get efficient climb after take-off. By climbing the Cessna at 103 mph, if no obstacles are ahead, the wings will be functioning in their most efficient manner.

And at this point it might be well for the pilot to include the L/D factor in his thinking of emergency procedure. In case of an engine failure in a single-engine lightplane, he can set up a glide speed to utilize the efficiency of the wings, thus giving him more time and distance to pick out a suitable field. Remember not to use flaps or lower the gear until it is certain that the landing area will be made.

As you recall, we indicated that the method to find the indicated airspeed for best L/D is rule of thumb. This is because anything that distorts the smooth flow of air over the exterior of the airframe can lower the overall efficiency. For increased speed and range, the wheels, wing flaps and cowl flaps should be retracted as soon as safe to do so. Minor details such as open windows, trailing, loop and transmitting antennas, small dents in leading edges of wings and stabilizers which have little effect on slow cruising aircraft, become of more concern at higher cruising speeds.

• *Aerodynamic efficiency of the propeller*—If air were visible and changed color with changing pressures as some solids do, we could watch a propeller-driven airplane in level flight and see the rotating blades slicing into the air and pumping it rearward in the form of a long tapering jet of air. It is this faster moving jet or slipstream which, in accordance with the laws of motion, thrusts the propeller and its attached airplane forward. The more air the propeller pushes back each second, the greater will be the reaction in terms of thrust.

Thus it is obvious that the more efficient the propeller, the more air will be pumped per second and the greater the thrust. The efficiencies of propellers range from 50 to 90 per cent. As propeller efficiency represents the ratio of the power derived from the thrust to the input power of the propeller, a low efficiency propeller means a waste of horsepower. This in turn means a needless burning of fuel to generate wasted power. This fuel not only represents dollars of operating expense, but also pounds of load.

Affecting efficiency directly is the shape of the airfoil of the blade along with the pitch distribution. Visualize that each blade of the propeller is similar to a wing; however, each blade is set to rotate in a vertical plane rather than to move in a horizontal plane. Pitch distribution refers to the twist of the blade, the way it is shaped to insure that each point along its leading edge, from root to tip, meets the air at an angle appropriate to the rotation speed of the blade at that point.

In view of this we find a certain pitch best for take-off conditions, another for climb, another for cruise at moderate altitude, and a steeper pitch which is necessary to bite efficiently into the thin air of the higher altitudes.

Controllable pitch propellers offer the advantage of being able to be adjusted to the load, but under heavy climb conditions, or when the tip speed approaches the speed of sound, considerable efficiency can be lost. For such reasons it may be advantageous when climbing to altitude with a heavily-loaded aircraft, to climb at a low rate-of-climb to permit a higher airspeed. This allows operation near the best efficiency compromise, and if the climb is slow enough—150 to 250 fpm—it means a decrease in the weight of fuel which must be carried to altitude.

Also propeller efficiency can be affected by improper techniques in achieving cruising airspeed after a climb. If upon attaining altitude, power and propeller settings are changed immediately for cruise, acceleration from climbing speed

to cruising speed will be slow as we are placing a heavier than normal load on the propeller and engine.

It is generally preferable—except under IFR conditions—to climb to 200 or 300 feet above the desired altitude, change to cruise power and propeller setting, and then "slide downhill" to the desired altitude. By doing this the mass of the airplane is accelerated to cruise speed and yet the engine and propeller are not overloaded for the particular power setting.

When flying IFR, the practice most often used, is to level off at the designated altitude, but maintain the climb power setting until a speed is reached in excess of cruise. Then the cruise setting is made and the airplane's speed settles to normal cruise.

● *Overall engine efficiency*—This efficiency for the reciprocating engine is determined by the amount of power supplied to the propeller as compared to the energy available in the fuel consumed. One pound of gasoline contains generally enough energy to produce seven and one-half hp for one hour. When the engine is pushed for its highest power output, the figure is decreased to a little better than one hp per hour per pound of fuel.

What is happening to fuel efficiency at the high output end? It seems that the difference in the theoretical power in the fuel and that actually produced can be traced to such things as poor or incomplete combustion, friction of moving parts, and heat loss through exhaust and cooling systems.

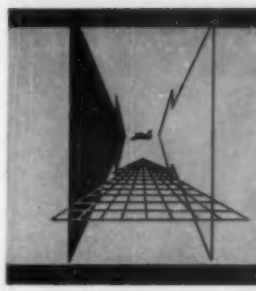
What can be done from the pilot's end to minimize the losses? Look closely at throttle, propeller and mixture settings. For every power setting there is one air-fuel ratio that will provide maximum economy. In the lightplane this can be most accurately set with the manual mixture control when flying generally at altitudes above 5,000 feet. Be sure to use proper leaning procedures as improper adjustment can result in damage to the engine.

Next, give some thought to control over friction—a pilot has more control over this factor than any other engine loss. The amount of friction is largely reflected by the distance of piston travel, and this can be reduced by using a lower rpm setting whenever practical. However, when this is done, an increase in manifold pressure is necessary if you wish to maintain the required power output. To get the proper balance of these adjustments, a pilot should refer to the operation manual for his specific airplane. Such tables in the manual will be convenient when setting up maximum, moderate, or long-range cruise power settings at various altitudes.

Also the charts aid in deciding how much the power should be increased to make up time when bucking a headwind, once you have established the velocity of the wind. On the other hand, the charts can aid in deciding on how much to reduce power when riding a tailwind in order to take advantage of the free push for a greater time.

Once having digested some of the basic

(Continued on page 86)



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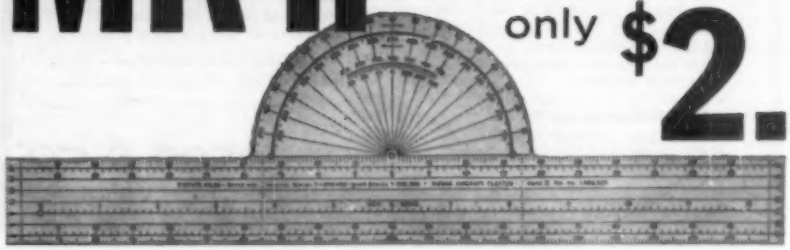

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(Continued from page 85)

aerodynamic facts, and being familiar with the use of the operating charts for the model airplane flown, you will find it fun in applying cruise control practices. Especially on extended cross-countries where you might wish to make as many miles as possible before stopping, maximum range cruise techniques will benefit you. Such techniques also apply to maximum endurance for holding procedure, photography, or surveillance work.

Remember, to gain maximum range, you will require the best compromise of the three efficiencies—i.e., aerodynamic efficiency of the airframe, propeller, and the overall engine efficiency. Remember that in piston-driven airplanes, maximum range airspeed falls near the airspeed for maximum L/D. But be sure to keep up a sufficient speed above stall to maintain control over the airplane at various loads and various degrees of bank.

Keep in mind that higher airspeeds are required when the airplane is heavily loaded than when it is lightly loaded. On long flights there should be a difference in airspeed at the initial and the latter stages of the flight. As fuel is burned off during the flight and the gross weight of the airplane is decreased, less power is required to sustain cruising speed.

If you are interested in exercising professional management over your airplane, try some cruise control—and see. END

The Bishop's Boys

(Continued from page 39)

able possibility of human flight. At that moment, the world's all-but-forgotten order for wings was accepted, by the only factory that could possibly deliver—a tiny shop in an uninspiring Midwest town. Quietly, these two lonely, self-educated mechanics resolved to build the world's first man-carrying flying machine. And from that moment until success was assured six years later, neither Wilbur nor Orville wavered one degree from their determined course to make workable wings for men.

Within days they had built a model wing and Orville was checking its behavior on the bike handlebars as he whizzed down Germantown Hill. It was aerodynamic testing and pilot training in a single, economical operation.

Some months later, Katherine stepped timidly into Rike's Drygoods Store downtown at the corner of 4th and Main, and asked for 56 yards of unbleached muslin. Yes, 56 yards—"Pride of the West" quality, please. Would the clerk be so kind as to cut it in lengths which could be sewn together to make two 45-degree bias panels each 6 by 40 feet? She would like it delivered right away, please, for her brothers to stretch over some frames they were making in the shop. Here was a detailed sketch her brother Wilbur had sent. . . . Cover for a multi-passenger bicycle, perhaps? Well, no; not exactly—her brothers would rather not say, if you don't mind. . . . Weren't her brothers the sons of Milton Wright, Bishop over on

West side? Yes—Wilbur and Orville Wright.

The story leaked out. Consternation reigned in the Bishop's flock. The brethren whispered quietly at first, but finally the furor spread over town.

We must recall that in 1897 the notion of men flying was downright repulsive. Not long off the books was a law prescribing that every railroad locomotive must be led by a man on foot, waving a red warning flag. Horseless carriages were still banned from 1st and 3rd Streets because they might frighten the real horses drawing streetcars along those thoroughfares. The suggestion that men might fly was blatantly sacrilegious. Maybe a few crackpots in a jet-dark room could persuade a table to float in the air at midnight, but it was spooky business —specifically anti-Christian and un-American.

God had given men the good earth and wished them well with it. The tree of good-and-evil topped at less than 100 feet. Man, in his presumptive conceit, had fallen from those branches 5,876 years ago, with a crash that was still shaking the world. The sky, with heaven close beyond, God had reserved for Himself and His angels. And here was this unholy mess happening right in the Bishop's own household. How could the Bishop expect the flock to follow God's law, and simultaneously condone his own sons and daughter flaunting it?

The whispering campaign slipped to sneaky blows below the belt. Neighbors said the Wright children were always queer. If the good Bishop had lowered his greying head from its protective faith, what he would have heard about his children would have broken his heart. But he let himself believe that all this commotion was merely a nightmare. Almost without his notice, it seems, the ground crumbled away beneath his feet. Piece by piece, his flock dispersed—individuals, then families, then whole groups. When all the flock was gone, the shepherd was left alone with his memories and what remained of his family. For this world, the Bishop was undone.

Even prior to all this, Milton Wright had been tagged as a controversial figure. During his tour as editor of the "Religious Telescope" he had accumulated enemies by his unbending attitude toward the rum traffic and secret societies. Many were surprised when he was elected Bishop in 1977. Now the forces advocating acceptance of alcohol, and secret societies, joined those who would be guardians against man's encroachment of God's heaven. They counter-attacked on the older issues, particularly the prohibition of membership in secret societies. In this manner, the records were kept free of personal reference to the Bishop's family or the unsavory subject of human flight. Milton Wright no longer held the office of Bishop. History puts him aside with these words: "After the litigation following 1899 . . . Bishop Wright lived a quiet retired life with his daugh-

(Continued on page 88)

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(Continued from page 87)

ter and sons in Dayton, Ohio, taking pleasure in the achievements in the field of invention of his sons, Wilbur and Orville." There is no mention of what his sons invented.

At the time, a few of the participants and many of the spectators actually enjoyed the situation. Here was a mighty strife between God and men, with the whole sky as the battlefield. In His wondrous way, God was sure to win in the end. They would see the crucifixion of a Bishop on a cross fashioned by his own sons, but they were disappointed: Bishop Wright never broke down in public. When a July hailstorm crashed on Dayton, the despised house on Hawthorne and the infernal shop on 3rd Street both escaped the heaven-sent thunderbolts.

As usual in times of crisis, the vocal men-of-the-world also exercised their wit. They summed up with the original aviation wheeze: "If God had intended men to fly, *He* would have given them wings!"

Scientifically speaking, all this was laymen's babble. Flying had no sicentific basis or repute. Practical scientists knew better, and even four years later the famous astronomer and mathematician, Professor Simon Newcomb, was so to reaffirm. In the September, 1901 issue of "McClure's Magazine," after discoursing learnedly on the eminent German scientist Lilienthal, killed five years previously in gliding experiments, he concluded: "The construction of an aerial vehicle which will carry even a single man from place to place at pleasure, requires the discovery of some new metal or some new force."

What waited at 1127 West 3rd Street to meet this challenge was a stock of random bicycle parts and a pile of unbleached muslin.

Wilbur, Orville and Katherine knew how the score stood at this stage of the battle, but were too busy to worry about it. Dozens of model wing designs were being tested on Orville's bike, and there were some 200 more to check in the new "wind box" at the shop. They had spent $16 building that box, and they demanded that it keep talking with lift-tables, 16 hours a day. The wing was the thing! Build a wing that would carry a man, and success was sure to follow.

Hold your hand in a natural, extended position, and look at it. In design, it is strikingly similar to the wing of a bird. Note that the nails are of a substance like the quill of a feather. Except for manicuring, they would extend at length until they split and feathered at the tips.

Considering that, for several million years, we haven't thought of using these appendages for flying, our hands remain surprisingly good rudimentary wings. The plan-form is that of a natural wing. The cross section is that of a modern, sub-sonic airfoil. Some day on the open road, extend your hand horizontally from a car window at normal cruising speed, and feel it lift your whole arm. With a little practice, you can control its lift coefficient by flexing the little finger. If you are spry enough, you can prove this same experiment from a fast-coasting

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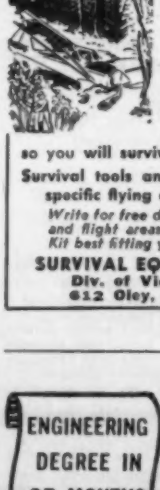

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bicycle. Orville did. Let your nails grow wild all your life, and with a hard downhill run into the wind, maybe you can take off.

If any man ever thoroughly understood and fully respected his own hands, he was Wilbur Wright. Equally important, he knew and appreciated the wings of that poor pigeon buried in the churchyard. He knew there was no pre-ordained difference between a man's hand and a bird's wing.

If God had intended men to fly, he would have given us wings? Who's to say He didn't? That, umpteen trillion years ago, man elected to develop these appendages not into wings, but into hands which could handle tools to make whatever else he chooses, was man's choice—not God's command. Now, God willing, it lay in the hands of Wilbur, Orville and Katherine Wright to build the wings for men.

Based on a man's hand and a pigeon's wing—modified for structural simplicity—the Wrights built their wing. With double seams that would have done her mother proud, Katherine sewed the muslin into bias, glove-fit panels, and her brothers tacked it to the light framework of rim-ash braced with bike-frame steel tubes and spoke-wire. Their wing had the lift expected of it. It would support a man in flight. But the first trials were sadly disappointing. In tethered tests with Wilbur aboard it worked fine, but in free flight it was dangerously unstable: no balance. After one bad crack-up, not even cocksure Orville was willing to further entrust his body to such an erratic apparatus. He still had *his* front teeth, and he intended to keep them. Wilbur was convinced the the wing itself was as near perfect as possible: something additional was needed to stabilize it.

Bishop Wright had taught his children that God knew the value of balance and that He had given men a balanced world: for every hill a valley; for every day a night; for every shower a rainbow; on and on around the whole earth. And when His world got out of balance, He wasn't bashful at throwing His weight around to stabilize matters. If mountains stood too high and mighty for the plains that supported them, He shook 'em down to size with an earthquake; if oppressive, hot, sticky air hung around in one place too long, He whiffed it away with a hurricane. Wings alone weren't safe; no balance. The answer: for every pair of wings, a tail. This was the rule for birds!

But what about angels? Nobody had ever mentioned seeing an angel with a tail. Wilbur returned to his books, and to save time, asked his father to recheck the scriptures. Together, they concluded that nobody had ever sworn to having seen an angel *without* a tail, either. Still, there was this human anatomy relationship. If, away back when, God had given His creatures their choice of hands or wings, were men already tailless so that they really had no choice? Wilbur compared the sketches of human and bird embryos. There was the answer, plain for anyone to see. The Bishop and Orville agreed. That settled it: the Wright

(Continued on page 90)

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(Continued from page 89)

flying-machine would have a tail.

It would be erroneous to assume, that in the tension that surrounded the Wrights, the brothers were able to perfect their machine without quarrels between themselves. Indeed there were many. Orville usually had the first and last word, with Wilbur resolving the difference quietly in the middle. Occasionally, there was a crisis. This tail affair was one of them. Once it was obvious that a tail was absolutely necessary to save the wing, Wilbur logically designed it to trail behind, in respectful following of all God's creatures. Orville contended that since he was to be the first test pilot, he wanted to lie on the wing and feel its lift with his own body, and demanded that the life-preserving tail be rigged out front in undisturbed air where he could watch it every instant. Even the Bishop thought that this might be twisting God's way a little too far. He prayed over the problem. They made a mechanic's compromise by placing the horizontal stabilizer out front where Orville wanted it, but rigged the vertical rudder behind the wing. This solved the problem of free-flight stability. While they were about it, they devised and incorporated an ingenious interlocking control system by which the wing was warped and the vertical rudder turned, in response to the hip-wiggles of the pilot lying in his cradle. This was the key that unlocked the secret of safe control, and the basis of their primary aviation patents.

As you know, the arrangement worked and the Wright brothers tail-first machine with double surfaces braced against each other was the first successful man-carrying glider on earth. Today, rare airplanes having the horizontal stabilizer in front of the wing are known as canard types. (Latest example is the B-70 exotic-fuel bomber.) There is no such thing as a tailless airplane, and never has been: those called tailless have wings swept back to where a tail would be, and the tail is actually built-in as a part of the wing tips.

Germantown Hill and its heckling spectators left much to be desired as an experimental site, so in September 1901, Wilbur and Orville removed their base to the desolate dunes of the North Carolina coast. A single shack housed the entire operation including living quarters. The brothers subsisted on salt meat, canned goods and brackish water. There was no real cooking, but Wilbur did the warming up. Each Sunday, they conducted their own religious rituals. For company, they had hordes of sand crabs and occasional droves of wild horses—said to be descendants of those from Sir Walter Raleigh's "Lost Colony." In the air were flocks of sea-birds and swarms of mosquitoes—some of them loaded with typhoid. The flight experiments went well; the first patents were applied for in March 1903, and gliding records were set to remain unbroken for a decade. Despite the mosquitoes, the outdoor activities appeared to help Wilbur's health and both he and Orville became proficient glider pilots.

During this time, Katherine was a student at Oberlin College. Bishop Wright

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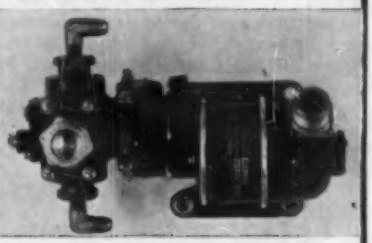

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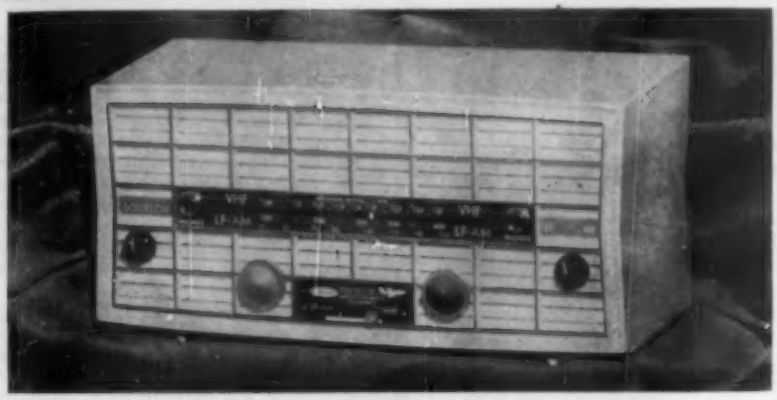
was left alone in Dayton but she visited him frequently, and in between, Lottie, the long-time family maid, looked after him.

With the successful and perfected glider, all that remained to capture sustained flight was to attach runners and add power. With Charlie Taylor's help, the brothers built a four-cylinder, 12-hp gas engine; bolted it onto the wing beside the pilot's cradle; made two 8-foot, 6-inch counter rotating propellers patterned on the paddles of a toy helicopter; glued them onto sprocket-end shafts with Arnstein's bicycle cement, and looped a couple of bike chains between the sprockets and the engine crankshaft. Orville could hardly wait to fire up those 12 mighty horses, and on the stormy day of December 17, 1903, at Kitty Hawk, Orville made the first powered flight from the surface of this earth. He was aloft ten seconds and made 112 feet at a maximum height of 14 feet. The brothers alternated as pilot for a series of hops—each higher and longer than the one before. On the fourth try for the day, Wilbur flew at over 100 feet altitude for 852 feet in 59 seconds. Those four short hops shrank the world and expanded the life of every human being on it, from then forevermore. Wilbur and Orville pushed the machine into its shed, and rushed unheralded back to Dayton to spend Christmas with Katherine and their father.

Four years later, in 1907 the Wright brothers were making routine daily (except Sunday) development flights near Dayton from the pasture of banker Torrence Huffman, then known as "Huffman Meadow" and since become the Huffman Reserve of Burroughs Bird Club. The pasture which they shared with the sheep, lay adjacent to Simms Station on the trolley line. Katherine, who meanwhile had graduated from Oberlin and was teaching modern languages at Steele High School, issued repeated invitations to her colleagues and their pupils to make a trolley-car excursion out to Simms Station and watch her brothers fly. Each invitation passed silently unaccepted. That same year, Charlotte Reeve Conover published her book "Dayton Saints and Prophets." This catalogue of local pride honored 24 prominent Daytonians and their families, all from the "right side of the tracks." Nowhere on its slick pages is there any reference to Milton Wright or any member of his family.

By 1908 they had temporarily given up trying to arouse any practical appreciation of their accomplishment in America, so Wilbur, Orville and Katherine went touring through Europe, demonstrating the practicality of their airplane. London, Paris and Rome proclaimed them heroes, and all of Europe embraced them. Now they were flying high, wide and handsome and they all enjoyed it. Katherine used her languages as they taught Europeans to fly. For a "busman's holiday," she and Orville floated off on a two-hour balloon ride. She created the hobble-skirt fashion fad by tying rope around the skirts of lady passengers. They established good agencies, but disappointingly, sold no airplanes. To meet

(Continued on page 92)



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(Continued from page 91)

expenses they were forced to release their French patent rights. They flew for royalty right and left, but respectfully declined a command performance before King Alfonso XIII of Spain because he had carelessly requested them to fly on The Lord's Day. A Russian Grand Duke proposed to Katherine. She instead accepted the long-standing bid of Henry Haskell, who had been a classmate at Oberlin. He and Katherine went to live in Kansas City, where he was editor of the "Star."

At long last, loaded with European medals and honors, Wilbur and Orville returned to some prophet's honor in their own land. New York's 1909 Hudson River celebration was enriched by Wilbur's sensational non-stop flight from Governor's Island to Grant's Tomb and return. President Taft presented them gold medals awarded by the Congress. The U. S. Army contracted from them at $25,000, one each Aerodrome, two-passenger type Wright, Model A—with the stipulation that it must be transportable on a standard army horse-drawn wagon, and incidentally fly at least ten miles at 40 miles per hour. They collected a five grand bonus for beating the specs, and bigger orders followed. Oberlin College granted each of them an honorary degree. The City Fathers gave them a scroll in recognition of their having made possible a new civic slogan: "Dayton—the Cradle of Aviation."

The success of their airplane was witnessed by numerous copyists, and the Wright patents were shamelessly infringed upon at home and abroad. They fought back, but the modest family means were still mostly tied up in some 50 odd patent suits when, at age 45, Wilbur's time ran out. He died of typhoid at Dayton in 1912, before he got his most persistent personal wish: Wilbur had always wanted a new bathroom for the little house at 7 South Hawthorne Street—still the family home after 40 years.

So long had the two brothers been in fact a single complex personality that to appraise them separately was incomprehensible. Nevertheless, all over the world, editorial and obituary authors did their best at the impossible task of last tributes to Wilbur without making it appear that Orville too had passed away. Perhaps it would have been as well to let Wilbur speak for himself, as in the document he wrote three weeks before his death:

Item II. "I hereby give to my father Milton Wright of Dayton, Ohio, my earnest thanks for his example of a courageous, upright life, and for his earnest sympathy with everything tending to my true welfare; and in addition I give and bequeath to him the sum of $1,000 which I desire him to use for little unusual expenditures as might add to his comfort and pleasure."

Item III, made affectionate monetary gifts to Katherine and the older brothers Ruchlin and Lorin.

Item IV. "The entire balance and residue of my estate, . . . including interests in patents, issued or pending, inventions, contracts and any and all holdings whether specifically mentioned or not, I

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give, . . . to my brother Orville Wright of Dayton, Ohio, who has been associated with me in all the hopes and labors both of childhood and manhood, and who, I am sure, will use the property in very much the same manner as we would use it together in case we would both survive until old age. And for this reason, I make no specific bequest to charity."

When he was 82, Mr. Milton Wright—former Bishop—seated himself beside his son Orville, on the lower wing of a Wright biplane, for his first flight. After circling for an hour over the Summit Street Church, South Hawthorne and West 3rd Streets, and Germantown Hill, Orville skidded them to a stop in front of the spectators watching from Simms Station platform. It was a large and mostly noisy crowd of curious on-lookers; fascinated by this big, strange, flying box. If, in green Huffman Meadow that day, there was a single sheep come to forgive his old shepherd, or to ask forgiveness of him, he held his uneasy peace. There was general applause and a few scattered cheers: the famous Wrights had made another famous flight. Orville arose and politely tipped his bowler. The old man sat still and erect. His eyes were closed. His snow-white head was still in the clouds, but his lips moved. Those closest were sure he was saying a prayer of thanksgiving, that Orville had brought them safely back to earth. But I judge the prayer of Milton Wright must have been, "Father, I thank Thee that when Thou tookest upon Thyself to suffer man to fly, Thou didst ordain my sons to deliver the wings." END

Hangar Flying

(Continued from page 14)

a ten-knot headwind, we would arrive after sunset.

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We had neither radio nor lights and they shot a green flare to clear us in. I made a right-hand base leg for the only runway I could see, lost it for a second during the turn onto final and leveled off a bit too high for my first landing on concrete. I needn't have worried, it was the best landing I ever made. It was only after they pointed out to me the power lines near the approach end of the runway that I finally learned my lesson: never stretch your luck or your glide to the limit. I think that I have been a better pilot since.

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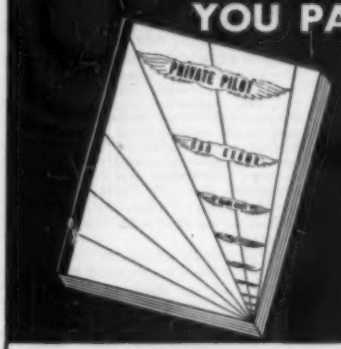

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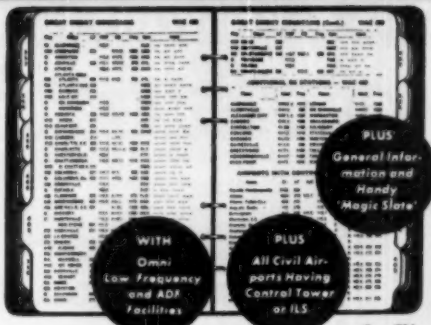

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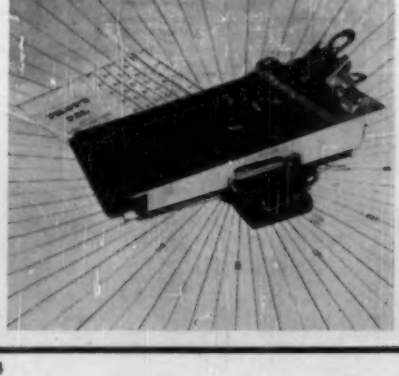

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Dec. 5-7—Special flight to Bimini, B.W.I., sponsored by Florida Aero Club. New hotel, Avis Bimini Club, complete "package" $49.50 per person (double occupancy). Includes transfers (car and boat), cocktail party, lodging, six meals, orchestra nightly. Only 30 minutes from Miami. Contact: Harry B. Collins, Air Cruise Director, 375 N.E. 154th St., North Miami Beach 62, Fla.

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Dec. 26-30—Sixth King Orange International Model Plane Meet at Miami, Fla. under primary sponsorship of the Air Training Corps. Over $5,000 in scholarships, trophies and prizes to be awarded. Write: Tom Sutor, Ch., Air Training Corps Flying Club, 5313 Granada Blvd., Coral Gables 46, Fla.

Jan. 14-16, 1960—Tenth annual convention of Agricultural Aircraft Association at the El Mirador Hotel, Palm Springs, Calif.

March 1-11, 1960—Third annual Flight to Mexico sponsored by Florida Aero Club. Starting vicinity of San Antonio (probably dude Ranch), Monterrey, Guadalajara, Mexico City, Acapulco, return to Brownsville, Tex. Contact: Harry B. Collins, Air Cruise Director, 375 N.E. 154th St., North Miami Beach 62, Fla.

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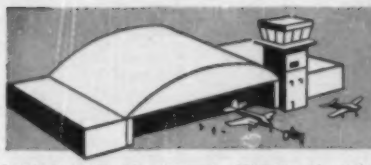

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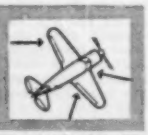

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Briefings . . .

(Continued from page 10)

small items—a filter and coupler—to automatic direction finding equipment (ADF receivers) currently in use. Designed for military application, Boeing engineers visualize a widespread potential for the system in both commercial and private flying.

IN THE PACIFIC NORTHWEST, a new company "Champcraft" formed as a subsidiary of Flightcraft, Inc., is representing Champion Aircraft Co., in the states of Oregon, Washington and Idaho. From headquarters at Portland International Airport, Ore., Champcraft not only offers all models of Champion aircraft but also stocks a complete inventory of parts for new and earlier Aeronca models.

SIDEWALL-INFLATED tubeless aircraft tires without valve stems, which are filled as one would fill a football are now being adapted to both military and commercial aircraft, according to Goodyear Tire & Rubber Co., the manufacturer. Inflation is accomplished by simply inserting an inflation needle into the tire, as

shown here on a Beech Bonanza, and applying an air hose at designated points. These tires are now being installed on most Cessna and Beech aircraft as original equipment.

MECHANICALLY DRIVEN AIRCRAFT, if current FAA proposal is adopted, will be required to grant right-of-way to refueling military aircraft. The rule change applies to Section 50.14(b) CAR and places tanker aircraft now in the same category with towing activities "since," according to FAA "the maneuverability of these aircraft would be considerably reduced in collision avoidance action."

ADD THE Legal Eagles Association to your list of aviation organizations. Recently incorporated under the laws of New Jersey, this association is open to all men and women who are licensed attorneys and hold valid pilot certificates. Original incorporators and trustees of LEA are: Albert Rathblott (P.O. Box 289 Camden, N.J.) Wm. G. Freeman and Alfred R. Pierce, also of Camden; Merrill Armour, Washington, D. C.; Alfred L. Wolf and Frank Kingdon Smith (author of "Weekend Pilot") of Philadelphia, Pa.; David C. Quinn, Howard G. Law and Stuart M. Speiser of New York City. (Mr. Speiser is author of "Preparation Manual for Aviation Negligence Cases.")

SHORTLY AFTER his 82nd birthday ex-Major Frank B. Wood (center) accomplished a feat that he had been looking forward to since he first saw the Wright Brothers fly at Kitty Hawk. After 22 hours and 35 minutes of flight instruction from Leo Price, v.p. of Sowell Avi-

ation, (left) Panama City, Fla., he soloed "in excellent style" a Tri-Pacer owned by his daughter, Mrs. Betty W. McNabb (right). FAA's reaction was to return Major Wood's approved application with the statement that a mistake must have been made in the applicant's age, and should be corrected.

CIVIL PILOTS who have been permitted radar direction around thunderstorms through the Stargazer service from 150 Air Force radar sites will find this vital aid eliminated, as the SAGE interceptor control systems goes into operation. Appeals for its continuation have been to no avail as FAA claims it cannot afford manning of these radar sites.

THE RAMP RASCAL" vaunted as a "mighty mite" capable of handling most light-twin-engine planes, while weighing only 75 pounds, is new on the aviation market —a product of the Industrial Products Div. of Permanent Filter Corp., 1800 W. Washington Blvd., Los Angeles 7, Calif.

Powered by a two and one-half hp air-cooled engine, it is quickly attached to the nose wheel of a plane; operates in reverse as well as forward, fast or slow and on gravel, sod, or hard surfaces. Its price is $395 f.o.b. Los Angeles.

FAA POSTPONED, until further study, the proposed regulation requiring private pilot medical certificates to be issued only by designated medical examiners instead of any locally licensed physicians.

MEETING IN Van Nuys, Calif., for its third annual business session, the National Flying Clubs Association re-elected Basil V. Delatour to serve as president for the coming year. Also re-elected were: Fred Guyon, v.p., and Leo Partridge, sec'y. (P.O. Box 2861, Hollywood 8, Calif.) New treasurer is Norman S. Smith. NFCA's future plans include a membership goal of 1,000 clubs by end of 1960; and streamlined procedures to obtain insurance for club-owned aircraft.

SOMETHING NEW in hostelry will serve transient air travellers at Washington's new Dulles Airport when in need of comfortable, short term wait-over accommodations in which to change clothes, work or relax between flights. Patented under the name of "Airwayte," the installation consists of two units of 18 pullman-like compartments designed for rental on an hourly basis. Supported nine feet in the air, the structure requires the ground space of only two parked automobiles for a lobby-reception area. The units at Dulles will be operated by Hotel Corp. of America, Boston. Construction contracts are arranged on a franchise basis through Airwayte International, Inc., of San Francisco.

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